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INVESTIGATING ARCHAEOLOGY



A Teacher's Activity Guide
for Fourth through Seventh Grades



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INTRIGUE OF THE PAST

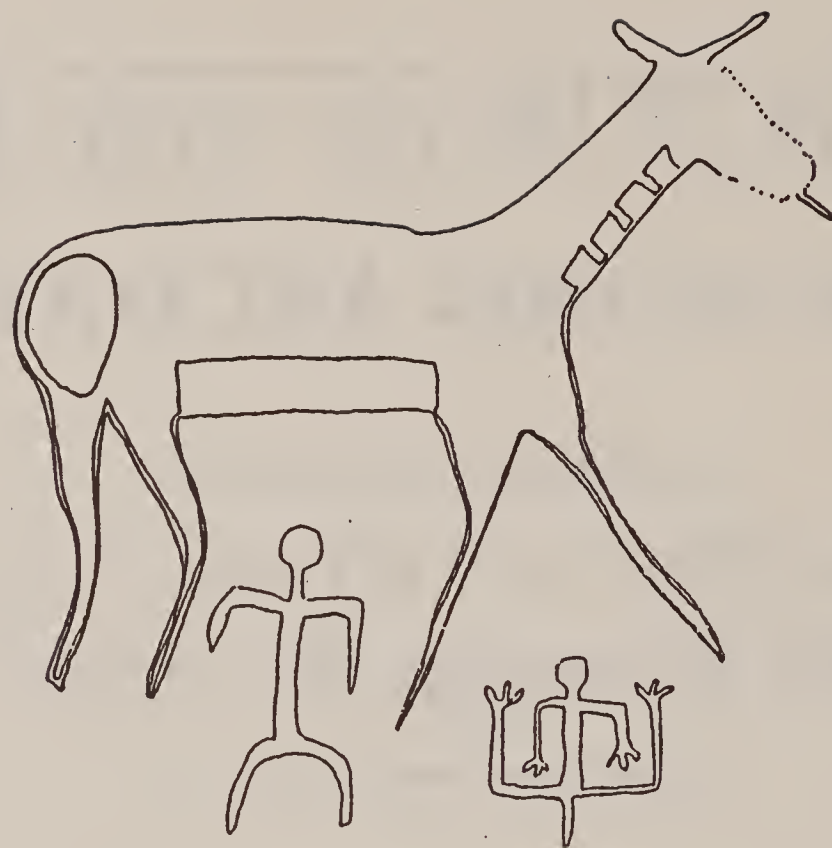
INVESTIGATING ARCHAEOLOGY

A Teacher's Activity Guide
for Fourth through Seventh Grades

Shelley Smith
Jeanne Moe
Kelly Letts
Danielle Paterson

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Utah Interagency Task Force
on Cultural Resources



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Design by Richard Firmage

Graphics by John Nielson

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Bureau of Land Management

National Park Service

U.S. Forest Service

The State of Utah

Contact: Bureau of Land Management, Utah State Office, P.O. Box 45155, Salt Lake City, Utah 84145-0155

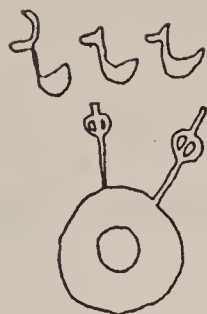


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PREFACE

Intrigue of the Past: Investigating Archaeology is an education program sponsored by the Utah Interagency Task Force on Cultural Resources, comprised of the Utah divisions of the Bureau of Land Management, U.S. Forest Service, National Park Service, and the State of Utah.

The ultimate goal of this program is educating students to take responsible and thoughtful actions towards our archaeological heritage. Utah embodies a remarkable and important record of past cultures, but this fragile record is increasingly threatened. The problem is widespread, occurring throughout the state (and the world), and affecting all kinds of cultural resources, from ancient ruins to more recent historic ghost towns.

Many people feel a sense of well-being knowing that there are still places where they can connect with lifeways and people gone by. For some, it is an Anasazi cliff dwelling, for others it might be the historic Mormon Trail. People with an ethnic connection to certain sites can experience a tangible association with their cultural heritage. As a society, we all can benefit from an understanding of how people before us lived in the very places we do today. How did they solve problems similar to ours, what can we learn from their experiences, what is the long-term climatic record of a region? The answers to these questions and many others are contained in archaeological sites.

The rate at which this important and fragile archaeological record is being compromised makes it critical that action be taken to stem vandalism. The Interagency Task Force on Cultural Resources recognized that a primary means of reversing the trend was education, and actively reaching out to school children.

This cooperative effort was led by the Bureau of Land Management (BLM), and directed by Shelley

Smith. She, along with Jeanne Moe (BLM), Danielle Paterson and Kelly Letts (both U.S. Forest Service) prepared the materials in this guide. Figures were drafted by John Nielson (BLM), and Stephen Poreda (BLM volunteer) supplied the colored photographs. The artistry of Joe Pachak inspired the graphics throughout the guide. Diane Saint-Thomas (BLM) assisted with editing drafts of the manuscript. Norine Holzer (BLM) good-naturedly prepared the typed manuscript. Richard Firmage served as layout designer and edited the final draft. Don Kauchak (Department of Educational Studies, University of Utah) provided expert assistance on educational topics.

Several people have helped us define the approach and content of this guide, and we thank them for their time and dedication, and for sharing their ideas with us. Among those who helped are: Daphne Sewing (Utah Division of Wildlife Resources, Project WILD Director), Gene Rogge (Arizona Archaeological Council), Nola Lodge and Dale Niederhauser (Department of Education Studies, University of Utah), Clifford Duncan (Ute Tribal Museum), Wil Numkena (Utah Division of Indian Affairs), Boone Colgrove (Utah State Office of Education), and Paul Enciso (Granite School District). Numerous archaeologists and educators reviewed the draft and provided comments. We want to especially recognize the many contributions of Deedee O'Brien, Teacher Workshop Coordinator, Utah Museum of Natural History. The 75 teachers who attended the 1990 and 1991 *Intrigue of the Past* workshops taught these activities in their classrooms; their invaluable experience and creative suggestions helped us to refine and improve the lessons, and we owe them a special debt of gratitude.



INTRODUCTION TO TEACHERS

The past . . . we all feel connected to our personal history, how it has shaped the person we are today and will condition who we become tomorrow. Our society too has been formed by its history and relationship to the land. The past offers us a unique perspective on who we are, personally and culturally. For hundreds of generations people have lived in the very places we do, have prospered, failed, and endured. Studying our past gives us a rare chance to examine our place in time and forge links with Utah's human continuum.

Utah's past is rich almost beyond belief. Few places in the world evidence such remarkable preservation of previous cultures, and in Utah the past is immediate and accessible. Anyone can easily travel in time here—explore abandoned townsites along the first transcontinental railroad or contemplate the meaning of creatures and patterns etched in rock by sure hands millennia ago in the West Desert. Refresh yourself at a desert spring and note by the chipped stone and broken crockery at your feet that you are simply the most recent visitor to a place that has meant survival to incalculable numbers of people. In many places in Utah, you can stand at a site and take in a landscape little changed by the centuries. You can see what others long ago saw, and imagine another way of life. You become a richer person for knowing the human history of your home.

The accessibility of Utah's prehistoric and historic sites, however, could soon mean the destruction of our cultural legacy. The number of sites that have not been disturbed or looted is dwindling at an alarming rate. Greed and ignorance are robbing us of our heritage, of our opportunity to experience and connect with our past.

An illegal and thriving market in antiquities supports the destruction of sites by looters in search of artifacts. Hikers and tourists collect a few pottery sherds or rusty horseshoes, not knowing that they are walking away with the data archaeologists rely on to study the lifeways of past people. Vandals walk on the fragile walls of ruins or spray-paint their names over rock art panels, ignorant or uncaring of the fact they are desecrating places of great

spiritual significance to Native Americans.

State and federal laws protect sites on public lands, but law enforcement is only part of the solution to protecting our past. Education and teachers will make the difference as to whether the school children of today will know and experience Utah's rich cultural legacy as the adults of tomorrow.

The effectiveness of this program depends on you, the teacher. We are not asking for a lot of time in your already crowded teaching schedule, nor a large investment in learning a new field of study. We aren't trying to cultivate legions of student archaeologists. Our intention is that every Utah student be aware that he or she lives in a place with a very special and threatened resource, that the evidence of the past is fragile, and that we all have a responsibility to see to its wise use.

To appreciate the importance of site conservation, students need a basic understanding of how archaeologists study the past. This Teacher's Guide teaches those basic ideas. The lessons require little preparation to teach, and use readily available materials. Many of them help you teach core curriculum requirements. This guide does not include guidance for undertaking time- and labor-intensive activities, such as mock digs and dioramas. While these activities can certainly enliven the study of archaeology, they are best built on the basic ideas presented here, and are not necessary for giving students a grounding in the science and issues of archaeology.

Archaeology is an integrative, interdisciplinary field. Archaeologists ask questions rooted in the social sciences, and research those questions using scientific methods. This fusion of the social and physical sciences means that archaeology is an excellent way to teach students to think holistically, to integrate information from different topics. The study of archaeology can also address some of the concerns of educators today—namely scientific inquiry, problem solving, observation-inference, cooperative learning, and citizenship skills.

Perhaps the most attractive aspect of teaching with archaeology is that you already have students' attention and interest. Almost everyone seems to

have a curiosity about it . . . the Intrigue of the Past. Archaeology is a fun and motivating alternative for teaching core requirements, while at the same time giving students information and a means for defining responsible actions.

A point of clarification: archaeology is often associated with ancient sites and artifacts. In the true sense, archaeology is a method of studying people by studying their artifacts and sites. There is no necessary time connection with antiquity. Archaeologists study the historic period as well as the prehistoric, and some archaeological methods are even applied to modern people and situations.

Archaeology is a sub-field of anthropology, a field of study which seeks to make general statements about human behavior. Archaeologists contribute to anthropological knowledge by applying archaeological methods to material remains—sites and artifacts.

The association with antiquity occurs because archaeology is the only way we have to study past people who did not leave a written record; in western North America, this includes nearly 98 percent of the human occupation span. Because of this situation, this guide uses examples primarily from the prehistoric past; but all of the methods and issues of archaeology presented here apply to sites of all ages.

Also, since information about Utah's historic period is readily available to teachers and students, Section Two includes essays only about Utah's prehistoric cultures, information that is not easily accessible elsewhere or written for students.

Three final points: First, while this guide focuses on Utah, of course there was no state boundary for most of the human history here. The prehistoric cultures discussed here occurred beyond what is now the state line. Second, the methods of archaeology and what is "known" about past cultures from archaeological study are constantly changing. New methods become available every year, and each new study of a site somewhat changes interpretations about past cultures. As in any healthy science, knowledge is tentative and constantly being revised. Finally, the terms "Native American" and "American Indian" are used interchangeably, and both refer to the people (and their descendants) who lived in North America prior to Euro-American contact.

Please contact *Intrigue of the Past* Archaeology Education Program, Bureau of Land Management, 324 South State, Suite 301, P.O. Box 45155, Salt Lake City, Utah 84145-0155, (801-539-4060) with your suggestions, questions and comments.

HOW TO USE THIS BOOK

This interdisciplinary guide is an instructional resource for studying Utah's archaeological past. The individual lessons in *Intrigue of the Past* support the Utah core curriculum in the subjects of science, social studies, language arts, mathematics, and art. Current teaching strategies such as scientific inquiry, problem solving, values clarification, higher level thinking skills (Bloom, 1956) and teaching/learning styles (Gregorc, 1982; Butler, 1984) are woven throughout the lessons.

Teaching cooperative skills at all levels of thinking is important. Specific cooperative learning lessons have not been included, except for one example in Section Two activities. Rather, most of the lessons lend themselves to the cooperative learning process. Teachers using cooperative learning are encouraged to adapt these and any other lessons to that model.

Instructors are encouraged throughout the guide to adapt the lessons according to teaching/learning styles, class size/age, time, subject, or any other considerations. Educators in scouting, outdoor education, youth groups, and after-school programs will also find this material useful.

Organization of the Guide

This book is organized into four sections.

- Section One—Fundamental Concepts in Archaeology
- Section Two—Utah's First People
- Section Three—The Process of Archaeology
- Section Four—Issues in Archaeology

The References Cited section lists sources used in the lessons.

The four sections are followed by several appendices which contain supporting material.

- Utah State Board of Education Core Curriculum Correlation
- Cross-Reference by Skill and Strategies
- Resource Directory for Teaching Archaeology
- Vocabulary
- Rules for Brainstorming

The Teacher's Guide is flexible; many of the lessons can be taught individually, although Section One is a prerequisite to the rest of the guide and is to be taught as a whole. Section Four activities are best taught after students have received a background in

archaeological concepts and methods. The guide can also be used as a unit of study or as part of a year's thematic study. Because there is no necessary sequence, some information is repeated in several places.

Description of Sections One Through Four (see Figure 1)

Section One: Fundamental Concepts in Archaeology

Activities in this section teach the fundamental concepts necessary for understanding archaeology: **the importance of the past, culture, observation-inference, context, chronology, classification, and inquiry.** Teaching this section as a unit prior to other lessons will prepare students to more easily assimilate information from the rest of the guide. The final lesson, "It's in the Garbage," is an activity in which students use each of the concepts they have covered in Section One to analyze and interpret archaeological evidence.

Section Two: Utah's First People

This section includes five essays presenting an overview of Utah's prehistoric people, arranged in chronological order from most ancient to recent times. Each essay is a reconstruction of prehistoric lifeways based on archaeological evidence. Teaching Options list many activities that provide a variety of opportunities for students to respond to the content.

These lessons are easily integrated into the 4th and 7th grade Utah Studies curriculum as the initial unit about Utah's past. The material can also be reviewed in abbreviated form for the history units of other grades to form a basis for comparison with contemporaneous historic developments in other parts of the world. Such a comparison assists students with integrating historic information on a global basis.

Section Three: The Process of Archaeology

This section is about the process of archaeology—**finding, excavating, analyzing, and interpreting archaeological sites and data.** The lessons build on the basic concepts presented in Section One, and some examples refer to Utah's prehistory as presented in Section Two. If taught as a whole, this section will give students a broad understanding of the archaeological process, but the lessons are designed to be taught singly as well.

Section Four: Issues in Archaeology

Many archaeological issues today revolve around how sites and artifacts are to be conserved and used. This section presents lessons about these issues, and gives students an opportunity to examine their own beliefs and values about the past. Students need background knowledge to thoughtfully form values. Therefore, lessons in this section should only be taught after students have obtained a broad understanding of archaeology. It is very important to give students the opportunity to draw together their knowledge and feelings about the past. Values clarification brings closure to the learning process, and promotes personal responsibility. A lesson on "Archaeology As a Career" is also included.

The final lesson, "Take Action—Save the Past," is a capstone to the guide. It provides educators and students with a creative problem-solving model if they wish to create and implement solutions to the problems of protecting archaeological resources.

Appendices

1. *Utah State Board of Education Core Curriculum Correlation:* Summary of the correlation to core curriculum standards and objectives.
2. *Cross-Reference by Skills and Strategies:* Lessons are cross-referenced according to teaching skills and strategies.
3. *Resource Directory for Teaching Archaeology:* A list of readily available materials that can be used to supplement lessons in this guide.
4. *Vocabulary:* An alphabetical listing of all defined vocabulary words used in this guide.
5. *Rules for Brainstorming:* A one-page master that can be copied and distributed to students.

Organization of Each Lesson

Each lesson in Sections One, Three, and Four is designed to teach one or two archaeological concepts. These lessons are organized in the following format:

Objective: highlights the content, process, and product of the lesson.

Materials: lists all materials needed for the lesson.

Vocabulary: list of key words, defined.

Background: information for the teacher.

Setting the Stage: an activity to “hook” the students’ interest.

Procedure: step-by-step process to teach the lesson.

Closure: an activity to reemphasize the objective(s).

Evaluation: suggestions for assessing student learning.

Extension: some lessons contain additional activities which address the objectives.

Link: a reference to other lessons that address the same or similar concepts.

References: sources from which background materials were drawn.

A key (at the head of each lesson) lists subjects addressed, skills learned, strategies used to teach skills and concepts, duration, and class size.

Activity sheets for students to complete are included in many lessons. Some lessons include masters which can be used as teaching aids. Both activity sheets and masters are reproducible as transparencies or handouts.

The activities are easy to prepare and all materials are included or readily available.

Strategies For Using The Guide

The following are examples of ways to use *Intrigue of the Past* to teach units in social studies, science, mathematics, language arts, and art. This guide can also be used to teach a unit in interdisciplinary studies. In all cases you are encouraged to teach all of Section One so that students understand the fundamental concepts of archaeology. Some suggestions for choosing and organizing lessons follow.

SOCIAL STUDIES

Intrigue of the Past lessons can be easily integrated into the social studies curriculum, especially Utah Studies. The following are two examples of how to use the lessons; many other strategies are possible.

Approach 1

This approach focuses on the Anasazi people.

Section One
all lessons

Section Two
focus on cultural history and change over time
(use Archaic and Anasazi lessons).

Section Three
Stratigraphy and Cross-dating
Artifact Classification
Archaeology and Tree-Ring Dating
Measuring Pots
Archaeology and Ethnographic Analogy

Section Four
Artifact Ethics
Grave Robbers
A Journey Back in Time
The Road Showdown
Take Action—Save the Past

Approach 2

This approach focuses on the Fremont, Numic, and Navajo people.

Section One
all lessons

Section Two
focus on culture history and change over time
(Fremont, Numic/Navajo lessons)

Section Three
Gridding a Site
Stratigraphy and Cross-dating
Pollen Analysis
Measuring Pots
Experimental Archaeology

Section Four
Rock Art One through Three
Archaeology—A Conservation Issue
Utah Place Names
A Journey Back in Time
Take Action — Save the Past



SCIENCE

Science objectives can be taught using many lessons in the guide.

Section One
all lessons

Section Two
focus on technology and past environments

Section Three

Stratigraphy and Cross-dating
Artifact Classification
Archaeology and Tree-Ring Dating
Pollen Analysis
Experimental Archaeology

Section Four

Archaeology—A Conservation Issue
The Road Showdown
Utah Place Names

LANGUAGE ARTS

Language Arts are used in many lessons; others can be adapted to focus on language.

Section One

all lessons

Section Two

focus on language arts activities

Section Three

Archaeology and Ethnographic Analogy

Section Four

Archaeology—A Conservation Issue
Artifact Ethics
Grave Robbers
Utah Place Names
The Road Showdown

MATHEMATICS

Many lessons contain mathematical application.

Section One

all lessons

Section Two

focus on activities using charts and graphs

Section Three

Gridding a Site
Archaeology and Tree-Ring Dating
Pollen Analysis
Measuring Pots
Experimental Archaeology

Section Four

The Road Showdown
Archaeology as a Career
Utah Place Names

ART

These lessons contain art activities based on the art work of prehistoric people.

Section One

all lessons

Section Two

focus on art activities

Section Three

Experimental Archaeology

Section Four

Rock Art One through Four

INTERDISCIPLINARY STUDIES

Archaeology is an interdisciplinary science and can be used as a theme for units in interdisciplinary studies. *Intrigue of the Past* lessons can be used to relate traditional classroom subjects to a year-long interdisciplinary program.

Although Section One's lessons have been categorized into subject areas, it is suggested they still be taught prior to lessons in the remaining sections.

Language Arts**Section Two**

focus on language arts activities

Section Four

Archaeology—A Conservation Issue
Artifact Ethics
Grave Robbers
A Journey Back in Time

Science**Section One**

Observation and Inference
Context
Classification and Attributes
Scientific Inquiry

Section Two

focus on technology and past environments

Section Three

Pollen Analysis
Stratigraphy and Cross-Dating
Archaeology and Tree-Ring Dating

Social Studies**Section One**

Why is the Past Important?



Culture Everywhere
Chronology
It's in the Garbage

Section Two
focus on cultural history

Section Three
Archaeology and Ethnographic Analogy
Experimental Archaeology

Section Four
Utah Place Names
The Road Showdown



Art

Section Two
focus on art activities

Section Four
Rock Art One through Four

Mathematics

Section Two
focus on activities using charts and graphs

Section Three
Gridding a Site
Measuring Pots

Supplement all phases of the interdisciplinary studies with various readings from Appendix 3: "Resource Directory, Recommended Readings—Children."

A Structure for Teaching

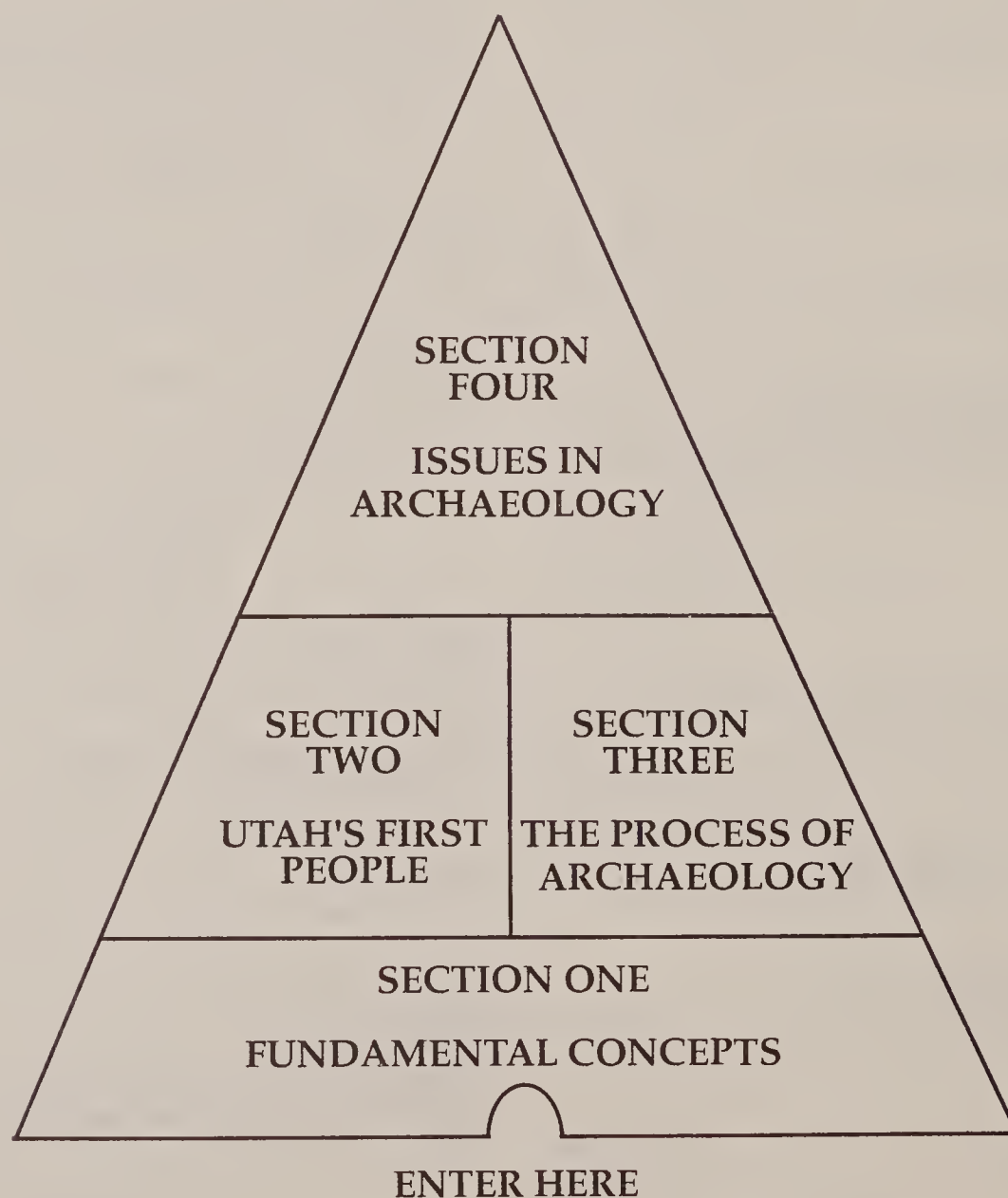


Figure 1. A structure for teaching *Intrigue of the Past*.

SECTION ONE

FUNDAMENTAL CONCEPTS





1

WHY IS THE PAST IMPORTANT?

SUBJECTS:	Science, social studies
SKILLS:	Knowledge, evaluation
STRATEGIES:	Brainstorming, discussion
DURATION:	15 to 30 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objective:

In this introduction to their study of Utah's archaeological heritage, students will use a personally owned object to:

1. Share the importance of their past.
2. Connect this importance with reasons why the human past is important.

Materials:

Students bring to class an object, photograph, or drawing that represents their past.

Vocabulary:

archaeological site: a place where human activity occurred and material remains were left.

archaeology: a method for studying past human cultures and analyzing material evidence (artifacts and sites).

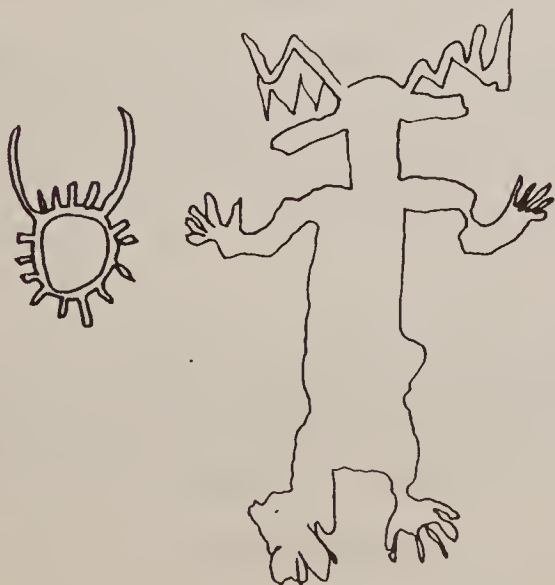
artifact: any object made or used by humans.

Background:

Sites and artifacts can be messengers from the past. If we know how to read their messages, material remains can tell us about the people who made and used them and then left them behind. Although the owners of the artifacts and the inhabitants of the sites may have lived hundreds or even thousands of years ago, they undoubtedly had many of the same needs and concerns, hopes and fears, joys and sorrows that we have today.

The messengers from the past belong to everyone. Everyone has a right to know how the world came to be and to know his or her place in the world. Material remains and their context play a universal role " . . . in providing cultural continuity and perspective, and hence in linking past, present and future within the experience of any given human generation" (Lipe, 1984, p. 2).

The link to the past is provided through scientific analysis as well as through traditional values placed on archaeological sites and artifacts. For example, Pioneer Trail State Park provides a tangible link to the settler history of Utah and it is valued for that reason. By examining historic buildings and objects, the park might also provide scientific information about the lives of the settlers. Similarly, some prehistoric sites in Utah may represent the heritage of American Indians and are valued accordingly. These sites are also capable of providing scientific information about the prehistory of the region.



Setting the Stage:

This lesson sets the stage for Section One. It will help students to begin to discover *why* we study the past. The remainder of Section One explores *how* we study the past.

Assign the students to bring an object (artifact) or photograph from home that tells about their family's past. If the object cannot be brought to class, a drawing will suffice.

Procedure:

1. Share background information and vocabulary.
2. Working in groups of 3 to 4, students tell each other what the object conveys about their past.
3. In a class discussion, ask the following questions:
 - a. Is it important for you to know about your past? Why or why not?
 - b. Is it important to know about the human past? Why or why not?
 - c. Humans have lived in Utah for at least 12,000 years. Is it important to know about their lives? Why or why not?
4. What can we learn from the past? The students brainstorm ideas. Some examples: how humans lived in the past and how and why human cultures changed over time.

Closure:

If your past is important to you, what statement can you make about the importance of the past in general?

Extension:

Repeat this lesson again at the close of your study of archaeology to demonstrate that students have broadened their understanding of archaeology and the past.

Reference:

Lipe, William D., 1984, "Value and Meaning in Cultural Resources." In *Approaches to the Archaeological Heritage: A Comparative Study of World Cultural Resource Management Systems*, edited by Henry Cleere. Cambridge University Press, Cambridge, U.K.





CULTURE EVERYWHERE

SUBJECTS:	Social studies, language arts
SKILLS:	Knowledge, comprehension, analysis, evaluation
STRATEGIES:	Brainstorming, categorizing, discussion
DURATION:	30 to 45 minutes
CLASS SIZE:	Any

Objective:

In their study of culture students will use a chart to:

1. Show the different ways that cultures meet basic human needs.
2. Recognize that archaeologists study how past cultures met basic needs by analyzing and interpreting the artifacts and sites that those cultures left behind.

Materials:

"Comparing Cultures" activity sheet for each student.

Vocabulary:

archaeology: a method for studying human cultures by analyzing material evidence (artifacts and sites).

cultural relativism: studying other cultures without making judgments about them.

culture: the set of learned beliefs, values and behaviors generally shared by members of a society. "The way the members of a group of people think and believe and live, the tools they make, and the way they do things" (Braidwood, 1967, p. 30).

ethnocentrism: the attitude that one's traditions, customs, language, and values are the only right and proper way and that other cultures are inadequate or wrong.



Background:

All people everywhere have several basic needs which must be met. These basic needs may be categorized as follows:

1. The need for food and water (economics).
2. The need for protection from the elements (clothing and housing).
3. The need to reproduce the culture (marriage, kinship, education).
4. The need for explanation (religion, philosophy, science).

What must be satisfied is universally human. *How* needs are satisfied is cultural. The many different ways that cultures have evolved to meet the basic human needs results in the world's rich cultural diversity.



When studying other cultures, there is a tendency to emphasize the differences among people, and to look at other cultures ethnocentrically. Cultures with less sophisticated forms of technology are frequently portrayed as simple-minded and naive. However, on the contrary, such people often have unequaled understanding, knowledge and adaptability to the environments in which they live. It is important not to accentuate "them" and "us." When scientifically studying other cultures it is necessary to suspend judgment. One culture is neither better nor worse than another, just different. This is the concept of cultural relativism.

A basic assumption of archaeological study is that people who lived in the past had the same basic needs for existence as do people living in the present. Archaeologists study past cultures by analyzing material remains (artifacts and sites) and trying to determine how people met their basic needs.

Many people mistake archaeology for a swash-buckling "Indiana Jones" adventure, and archaeologists often are thought of as questing after rare and beautiful artifacts. Although it is true that at times archaeologists do find rare and beautiful things, they could more accurately be compared to Sherlock Holmes, a detective of the past, gradually piecing together the culture of a people to understand more about them. A lone artifact discloses almost nothing about a culture. It is by studying many sites and artifacts and their relationship to each other and the environment that one discovers the way people lived. Archaeologists study people's culture by studying the things they left behind.

Setting the Stage:

List on the board students' responses to the following: What do you need to have in order to live? What did your great-grandmother need? What does a child in Africa need? What will humans need in the future?

Procedure:

1. Students discover through the "Setting the Stage" activity that humans everywhere have similar needs. Now, help students categorize their list. They do not have to arrive at the four categories outlined above. Anthropologists themselves do not agree on how to categorize the needs. For example, the students may come up with eight needs: food, water, shelter, clothing, reproduction, transportation, education, and explanation.

2. Distribute the "Comparing Cultures" activity sheet to the students. Write the category of basic needs (food, shelter, etc.) down the vertical column on the chart's left side. Choose another culture to analyze—for example, an East African culture, the culture of Mexico, or any culture with which your students are familiar.

3. The students construct the chart, comparing and contrasting the basic human needs as they are met in different cultures.

4. In a class discussion, the students compare and contrast our culture with others. If different cultures seem strange or inferior to the students, inform them that our culture can be baffling to people from another culture. For example, Hindus are horrified at the thought of eating meat; it is against their religion to do so.

5. How do archaeologists study *past* cultures? Because archaeologists can neither ask the people who left the artifacts how they met their needs, nor observe them using the artifacts, past behavior must be inferred from the material remains of the culture. For example, if corn cobs are present archaeologists would infer that the people were farmers at least part of the year.

Note: Do not single out or make an example of students in your classroom who are from minority ethnic groups. The attention can be embarrassing and hurtful. However, welcome what these students might freely offer to the study of other cultures.

Closure:

As the students analyze their charts, what can they say about the similarities and differences in the way cultures meet their basic needs? How do archaeologists study past cultures?

Evaluation:

The students turn in their activity sheets for evaluation.

Links:

Section Three, Lesson 21: "Archaeology and Ethnographic Analogy: The Anasazi and the Hopi"

Section Four, Lesson 33: "Utah Place Names"

Reference:

Braidwood, Robert J., 1967, *Prehistoric Men*. 7th ed. Scott Foresman, Glenview, IL.



Comparing Cultures

Name: _____

Basic Needs	Us	Settlers	

Use additional sheets if necessary.





OBSERVATION AND INFERENCE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Scientific inquiry, decision making, problem solving, writing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; groups of 2 to 4

Objective:

In their study of observation and inference the students will use worksheets and coins to:

1. Differentiate between observation and inference through a problem-solving approach.
2. Demonstrate their knowledge by analyzing an archaeological artifact and creating their own observation-inference statements.

Materials:

"Boy in the Water" activity sheet and master, and "An Ancient Coin" activity sheet for each student, and/or transparencies of each. A collection of foreign or U.S. coins (one per each student/team).



Vocabulary:

artifact: any object made or used by humans.

data: information, especially information organized for analysis.

hypothesis: a proposed explanation accounting for a set of facts that can be tested by further investigation.

inference: a conclusion derived from observations.

observation: recognizing or noting a fact or occurrence.

Background:

Science is based on observation and inference. Any phenomenon being studied must first be observed, whether it be from a satellite or through a microscope. An inference is a proposed reason for an observation. The hypothesis is a chosen inference that the scientist will prove or disprove through testing.

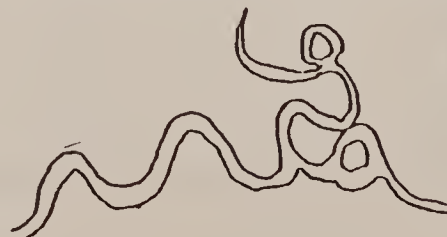
Archaeologists use observation and inference to learn the story of past people. By making observations about objects (artifacts and sites) they infer the behavior of the people who used the objects. When archaeologists find the remains of a large village (observation), they could infer that the people were farmers. To test that inference (hypothesis), they would look for evidence of farming such as farming implements (like hoes), and food remains from crops (corn cobs and squash seeds). If they find these things, their hypothesis is verified. Archaeologists construct careful hypotheses and examine alternatives when making inferences from archaeological data.

Setting the Stage:

1. Present students with a possible observation-inference scenario from their lives. Example: All the students in this classroom who ate in the cafeteria on Tuesday were ill on Wednesday (observation).

2. What many and varied reasons (proposed inferences) might there be for this illness? Examples: food poisoning, virus, a student uprising.

3. In what ways might one or more of these inferences (hypotheses) be tested in order to come to a conclusion about the cause of the illness? Examples: Send all the students to the school nurse for examination; test the food from Tuesday; obtain a medical history from the parents of each student.



Procedure:

1. "Boy in the Water"
 - a. Project or distribute the master of the "Boy in the Water." Project or distribute the "Boy in the Water" activity sheet.
 - b. Read each statement and ask students to decide if it is a statement of observation or of inference. Ask them to give reasons for their answers.
 - c. How might one or more of the inferences (hypotheses) be tested?
 - d. Correct either as you proceed or immediately following the activity.
 - e. Create a definition for observation, inference, and hypothesis.
2. "An Ancient Coin"
 - a. Project or distribute the activity sheet "An Ancient Coin" and explain that the coin was found by an archaeologist at a site.
 - b. Which statements are observations and which are inferences? Which observation is each inference based on?
 - c. Many different inferences are possible from one observation. What other inferences might be made from observing this coin?
 - d. Choose one inference (hypothesis) and think of ways archaeologists might test it by looking at other evidence at the site (e.g., If people are peace loving, archaeologists would not expect to find a lot of weapons or protective gear.)

Closure:

Ask the students to summarize what they learned about the importance of observation, inference, and hypothesis in archaeology.

Evaluation:

Be an archaeologist. Give each student/team a foreign or U.S. coin and ask them to pretend they have found the coin at an archaeological site. Ask them to create a list of observation statements and inference statements about the coin. Collect and correct their statements or have them exchange their statements with another student or team to work through. Each team will correct their original statements. Students choose one inference as their hypothesis and describe how they might test their hypothesis.

Links:

Section Three, Lesson 17: "Artifact Classification"

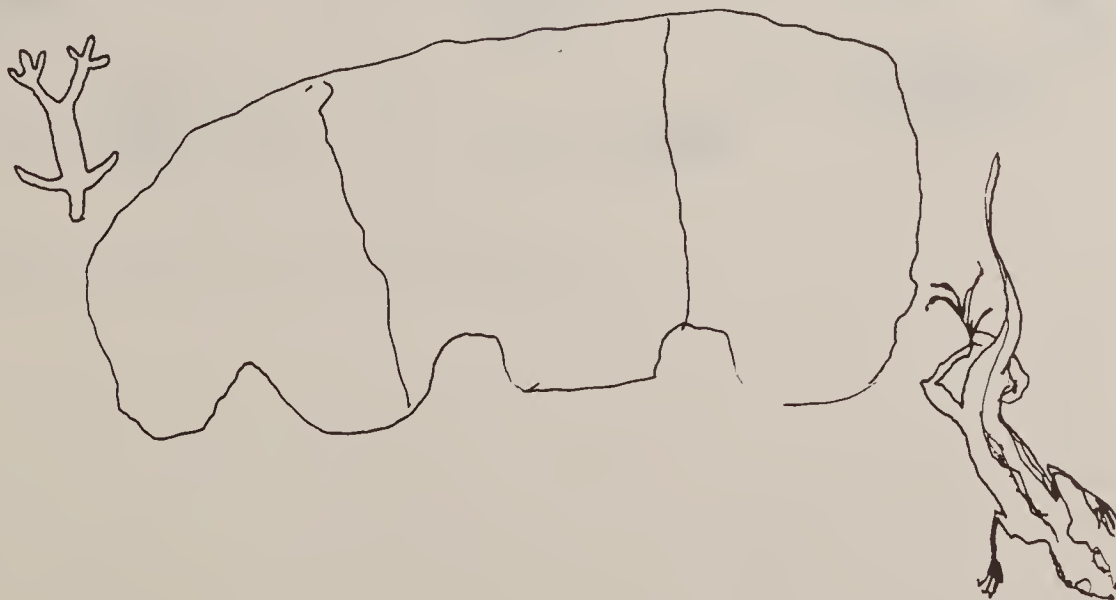
Section Three, Lesson 21: "Archaeology and Ethnographic Analogy: The Anasazi and the Hopi"

Boy in the Water Activity Sheet Answers

1. O	2. I	3. O	4. I	5. I	6. O	7. I	8. I	9. O
10. I	11. I	12. O	13. O	14. I	15. I	16. I		

An Ancient Coin Activity Sheet Answers

1. O	2. I	3. O	4. O	5. I	6. I
------	------	------	------	------	------



Boy In The Water



**Boy in the Water**

Name: _____

Place an 'I' before the statements that are inferences, and an 'O' before the statements that are observations.

- ___ 1. The boy is in the water.
- ___ 2. The weather is cold.
- ___ 3. The tree branch is broken.
- ___ 4. If the boy crawled out of the water the goat would butt him.
- ___ 5. The boy fell off the branch.
- ___ 6. A goat is standing by the pond.
- ___ 7. The branch will fall on the boy's head.
- ___ 8. The boy fell off the rocks.
- ___ 9. There is a sailboat in the water.
- ___ 10. The sailboat belongs to the boy.
- ___ 11. The goat will soon leave the pond.
- ___ 12. The tree by the pond has no leaves on it.
- ___ 13. There are three rocks in the pond.
- ___ 14. The tree by the pond is dead.
- ___ 15. If it rains leaves will grow on the tree.
- ___ 16. The goat butted the boy into the pond.



An Ancient Coin

Name: _____



Place an "I" before the statements that are inferences, and an "O" before the statements that are observations.

- ___ 1. There is a representation of a face on one side of the coin.
- ___ 2. The coin tells us that these were deeply religious people.
- ___ 3. The words "We Trust the Gods" are printed on the coin.
- ___ 4. On one side of the artifact is a drawing of leaves.
- ___ 5. We can tell from the artifact that these were peace-loving people.
- ___ 6. The face on the coin is a representation of the nation's king.



CONTEXT

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, synthesis, evaluation
STRATEGIES:	Game, discussion, problem solving, writing
DURATION:	30 to 60 minutes
CLASS SIZE:	Any; groups of 5 to 6

Objective:

In their study of context students will use a game and a discussion to demonstrate the importance of artifacts in context for learning about past people.

Materials:

Index cards.

Vocabulary:

context: the relationship artifacts have to each other and the situation in which they are found.

Background:

The things that people own or have made can tell something about the person. The objects a person has chosen to have can indicate the person's age, gender, and interests. For example, a baseball bat and a football helmet in someone's bedroom could suggest that the owner probably likes sports. Posters of pets and a collection of stuffed animals could mean that the person is an animal lover. The objects (artifacts) can only tell a complete story if they are found together, where their owners left them (in context).

Archaeologists rely on the objects that people made (artifacts) and where they left them (context) to learn the story of past people. Think of a prehistoric pottery bowl, beautifully painted. It has a very different meaning if it is found at a prehistoric site buried with someone than if it is found full of corn in an ancient storage room. Its meaning changes further if it is found in someone's modern living room—the bowl has now lost its original context and all connection with its prehistoric owners. It has

become only a thing, no longer a messenger from the past.

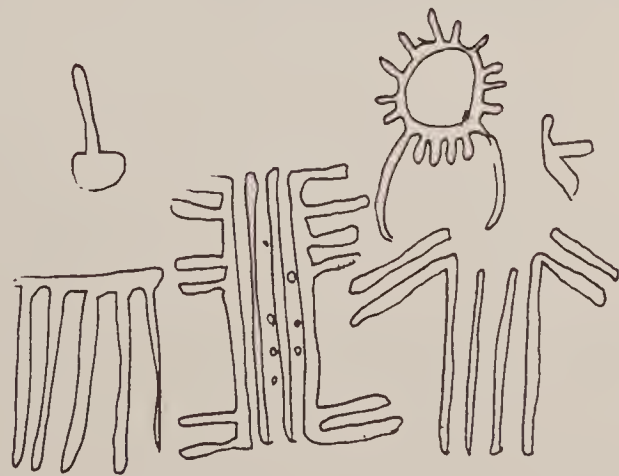
Archaeologists preserve the context of artifacts they recover from sites by recording the location of everything they find. The artifact and its context provide more information to the archaeologist than could the artifact alone. When context is lost, information is lost.

Setting the Stage:

1. Ask the students: If I had never met you and walked into your room, what would I know about you from the things you have there? Would I know if you were a boy or a girl? Would I know what your interests are? Would I know if you share your room?

2. Think of something in your room that is very special to you. How does that object tell something about you, along with everything else in your room? Everything together tells about you because it is in context. You have selected certain things to have, and these things tell about you when they are all found together.

3. Now imagine that your special object has been taken from you and is found in the city park. How does this change what could be known about you? When it is removed from your room, the object alone tells nothing, and your room is now missing an important piece of information about you. Context has been disturbed, and information about you is now lost.



Procedure:

The importance of context in archaeology can be demonstrated by the The Game of Context:

1. Tell the students they are going to play a game requiring that they think like archaeologists. Divide the class into groups of 5 to 6 students, and assign each group a different number. Give each student an index card and pencil. As a group, they are to choose a room or type of building such as a hospital operating room, a kitchen, or a hardware store. They decide what objects (artifacts) in the room make it distinctive; then each student writes one clue on his or her card, for a total of 5 to 6 clues per group. Each card also has the group number written on its back side.

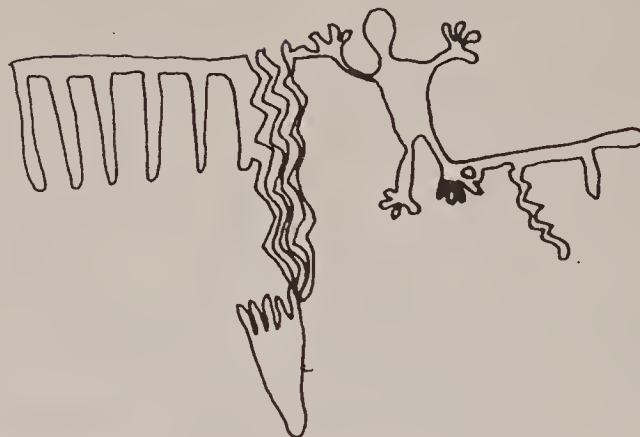
2. The stack of cards from each group is passed to the next group, until every group has seen every stack and tried to infer the function of each place. Be sure the other groups do not hear the correct answers. Each time, before the cards are passed, have a student remove one card and place it off to the side so it does not get mixed up with the other sets of cards.

3. The teacher reviews each group's stack, asking how many groups correctly guessed the rooms' functions.

4. Ask: Is it possible to know the function of the room now? Is one object taken out of context (like a card removed at random) able to give as accurate a picture as are all of the objects in their place of origin? This demonstrates that removing artifacts from a site removes them from their context and makes it very difficult to get a complete understanding of past people.

Closure:

Artifacts in context are the basis for all understanding about prehistoric people; archaeology is a science of context. Imagine that an archaeologist finds your classroom a thousand years from now. Can you make a statement about how artifacts in the context of your classroom will enable the archaeologist to learn about your class?



Evaluation:

Have the students complete the "Context" activity sheet.

Links:

Section Three, Lesson 15: "Gridding a Site"

Section Three, Lesson 16: "Stratigraphy and Cross-dating"

Context Activity Sheet Answers

1. List could include items such as ruffled curtains, posters, collections of dolls or model cars, certain types of clothing, photographs, other art work, the colors of furnishings, number of beds and dressers, souvenirs.
2. The listed items could indicate the student's sex, age, interests, places they have visited, their dreams and hopes, hobbies, amount of allowance, habits, and whether or not they shared their room.
3. Since these things are out of context, they tell nothing about their owner. In fact, it cannot be established if the artifacts once belonged together, so the story of their owner cannot be learned.
4. Artifacts and their context provide the evidence archaeologists need to learn about the past. If clues are removed or moved, information about the past is lost forever.



**Context****Name:** _____

1. List ten things in your bedroom that would tell about you. Imagine the things on your list to be clues for an archaeologist.

2. Imagine an archaeologist finds your ten items. What might he/she know about you?

3. All of the things in your bedroom are in context. What could be learned about you if the things in your bedroom were scattered all over town?

4. Why is it important to leave artifacts in place at archaeological sites?



CHRONOLOGY: THE TIME OF MY LIFE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Discussion, problem solving, analogy, forecasting
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; groups of 2

Objective:

In their study of chronology the students will use personal time lines and an activity sheet to:

1. Attempt to order a classmate's timeline and demonstrate the importance of intact information to achieve accuracy.
2. Compare their timelines with the chronological information contained in a stratified archaeological site.

Materials:

Ten strips of colored paper, scissors, glue, ruler; "The Time of My Life," "The Life of ____" and "Stratigraphic Section" activity sheets for each student.

Vocabulary:

chronology: an arrangement of events in the order in which they occurred.

stratigraphy: the layering of deposits in archaeological sites. Cultural remains and natural sediments become buried over time; the layer on the bottom is the oldest, the layer on top is the youngest.

timeline: a visual representation of events in chronological order.

Background:

The proper sequence of events must be known when trying to understand the past. Chronological order means that events are arranged in the order of occurrence, establishing a chronology. One way to

display events visually in chronological order is with a timeline. A timeline is divided into equal time segments (month, year, or century, for example), with one end representing the oldest events and the other end the most recent events.

Chronology is something we all use everyday. When somebody tells us a story or when we watch a news report, it only makes sense if we can understand the story as it happened. Archaeologists always try to establish the age of the sites, artifacts, or events they are studying so that they can place them in chronological order. Each piece of information contributes some understanding to the overall story of the past, but only if the information can be placed in chronological order.

Archaeological data are often buried. Sites become buried by the deposition of small-grained particles (sand or dirt) through the action of wind, gravity, and water. When archaeologists dig a site, they record the location of what they find, so that chronological order can be established. Objects discovered at the bottom of pits dug by archaeologists are the oldest, while those near the surface are the youngest.

When vandals and artifact-seekers dig a site or collect artifacts from the surface, they remove objects which could place the site in time, and therefore, the archaeologist cannot learn the site's chronological placement. Vandals mix the stratigraphic layers together and archaeological events cannot be placed in order. (While events in our lives typically have a short time duration, archaeologists use the term "events" to signify lifeways over a span of time.) A page of the past has been torn up and thrown away, destroyed.

Everyone can help stop this problem by not digging in sites or collecting artifacts, by refusing to buy artifacts from people who dig and destroy sites,



and by reporting people they see digging and collecting artifacts to law enforcement officials.

Setting the Stage:

Tell the story of Goldilocks out of sequence, leaving some parts out. Ask students to describe the problems with the story. Why is it important to relate sequential information, including all the important details?

Procedure:

1. Define chronology and state the necessity of establishing chronological order when studying the past.
2. Have the students list ten events in their lives, one on each of the ten strips of colored paper. Next to each event, students list or draw an object that might symbolize that event. These events should not have obvious time links, such as "my eighth birthday party", or "I started 4th grade." The events could be things like "my sister was born (rattle)", "the family moved (moving van)", "we went to Yellowstone on vacation (tent)." Students should try to include events from their entire lives.
3. They then shuffle their strips and exchange them with another student, who tries to lay the strips out in correct chronological order with the most recent at the top.
4. The two students who have exchanged strips then tell each other their best guess of the proper chronological order. The strips are then returned to their owners. This is usually a humorous experience for students.
5. Discuss: Were you able to reconstruct the timeline correctly? Why or why not? It is difficult, sometimes impossible, to reconstruct a story if the order of events is not known.
6. Ask students to randomly remove four events from their personal timeline. Ask students if the chronological order would have been more difficult to construct and if the story of their classmate would have been as complete if there were even fewer strips. Connect this activity to archaeological sites by stressing how archaeological data is usually impossible to place in chronological order if artifact collectors have dug up a site (like mixing up the event strips) or if people have removed artifacts (equivalent to removing some of the event strips).
7. Distribute the "The Life of _____" activity sheet (which forms the backing for the timeline). Students glue their own strips in chronological order beginning with the most recent event at the top on their backing paper. They can write the year of the event (or they can number the events one through ten) in the column to the left of their strips.

Closure:

1. Distribute a copy of the "Stratigraphic Section" activity sheet to each student. Have them lay their timeline next to it.
2. Use the sheet and their timelines to explore the following questions:
 - a. What do you notice about the information on the "Stratigraphic Section" activity sheet?
 - b. In what ways is the "Stratigraphic Section" activity sheet similar to your timeline? In what ways is it different?
 - c. Imagine that you cannot remember significant events in your life. How would that change the history of your life?
 - d. Does digging in an archaeological site result in the loss of information about the past?
 - e. In what ways is a hole dug by vandals in an archaeological site similar to a loss of significant events in your life?
 - f. In summary, what might you say to an artifact collector about the importance of leaving sites undisturbed?

Evaluation:

Have the students complete the "The Time of My Life" activity sheet or use it for a discussion. Or ask the students to present an extemporaneous persuasive speech that defines chronology as used by the archaeologist and explain the importance of intact sites for establishing chronological order.

Links:

Section Three, Lesson 16: "Stratigraphy and Cross-Dating"

Section Three, Lesson 18: "Archaeology and Tree-Ring Dating"

Section Three, Lesson 19: "Pollen Analysis"

The Time of My Life Activity Sheet Answers

1. Students should express regret, or a feeling of being upset. For someone to wantonly destroy the only evidence of another's life indicates that they have little respect for the meaning of that person's life.
 2. By extension of the previous question, students should link their feelings about destruction of their timeline to destruction of evidence of past peoples' lives.
-



The Time of My Life

Name: _____

1. Write a short paragraph about how you would feel if your time line was all that would ever be known of you, and somebody tore part of it up.

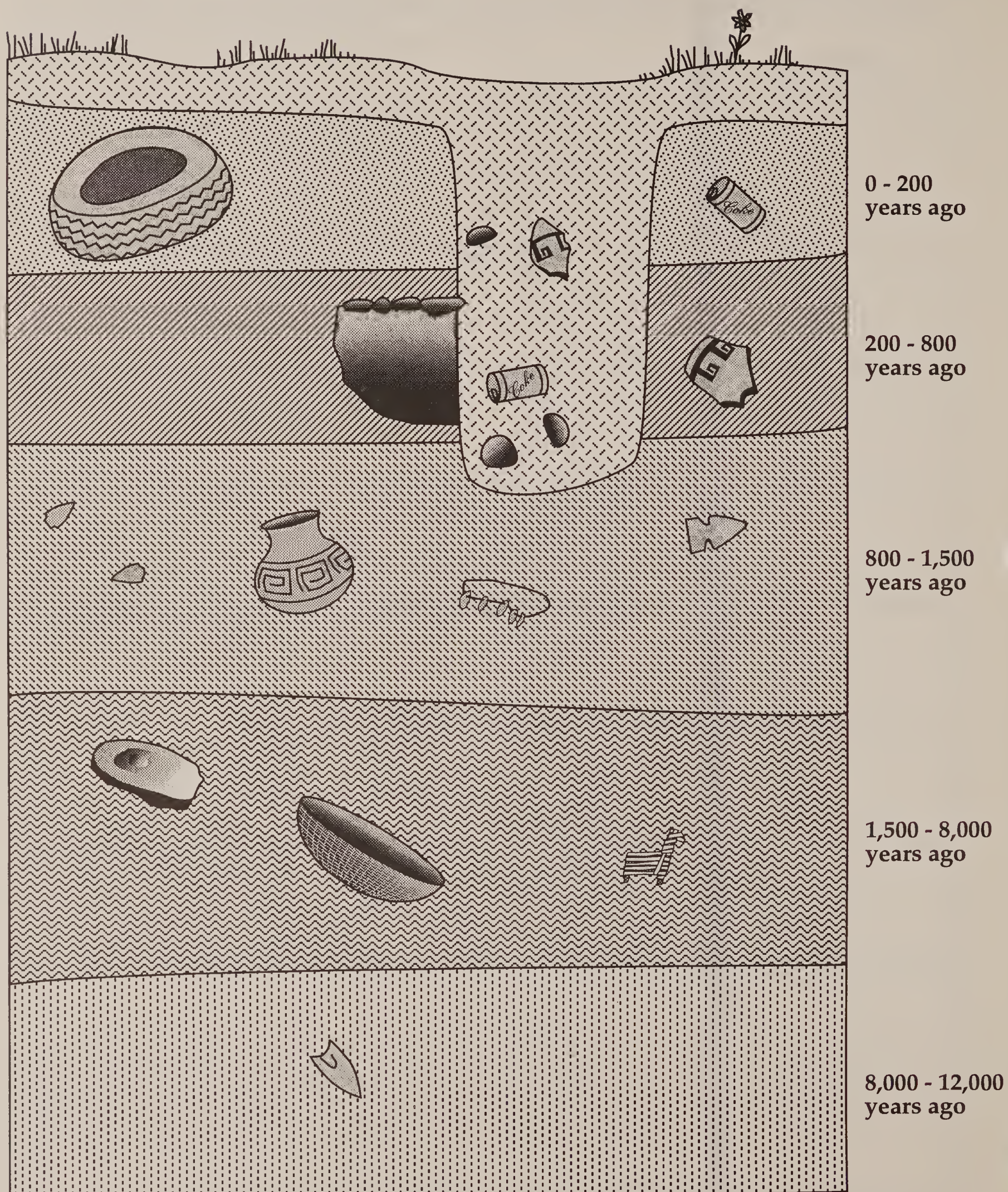
2. How do you think an archaeologist feels when she or he visits a site that has been dug up by vandals?



The Life of

TODAY

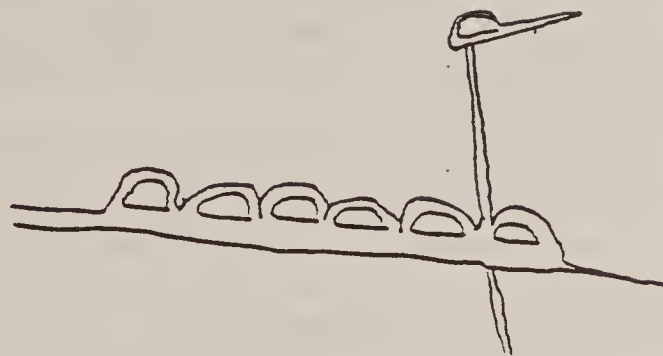
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CLASSIFICATION AND ATTRIBUTES

SUBJECTS:	Science, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Observation, classification, comparing and contrasting, scientific inquiry, decision making, writing
DURATION:	30 to 45 minutes
CLASS SIZE:	Any; groups of 3 to 4



Objective:

In their study of classification and attributes students will use doohickey kits to:

1. Classify objects based on their attributes.
2. Explain why scientists and specifically archaeologists use classification.

Materials:

Doohickey kit for each group each kit containing about two dozen familiar objects, such as bolts, string, rocks, paper clips, and cloth; "Artifacts From A Mining Camp" activity sheet for each team.

Vocabulary:

artifact: any object made or used by people.

attribute: characteristics or properties of an object such as size, color, or shape.

classification: systematic arrangement in groups or categories according to established criteria.



Background:

A basic element of thinking is classification. We place objects and situations into conceptual categories in order to make sense of the world so we don't have to respond to each new object or situation as a completely new experience. Classification also helps us to sort a multitude of sensory impressions quickly and enables us "... to cope with complexity that might otherwise be overwhelming" (Hull, 1970, p. 150).

We classify objects almost automatically. This is accomplished by choosing certain attributes to pay attention to while ignoring others. We cannot take all attributes into account at once, therefore, we select only a few as being relevant to the task at hand. For example, if we have a group of blocks alike in every way except for color, then color is going to be the attribute used for categorization. If size is variable, then it, too, could become important for categorizing the objects.

Classification of data is an important part of any scientific study, including archaeology. Scientists must categorize data based on various attributes to reduce their complexity and to examine the relationships between types of data. For example, it is not possible to compare each individual house cat with every other member of the cat family. Instead, the category "house cat" includes creatures with certain shared attributes. All "house cats" are not identical, but all fall within a range of variation. The category "house cat" can then be compared with the category "tiger," or "lion," or "lynx."

Objects (artifacts) left by past people form the archaeological data base. Like all other scientists, archaeologists classify data (in this case artifacts and sites) into categories based on their attributes. A Fremont site might contain hundreds of pottery sherds which vary in appearance. An archaeologist cannot compare every pottery sherd to every other pottery sherd. Instead, he or she classifies the pottery into categories and compares the categories, thereby greatly decreasing the number of comparisons that have to be made.

Procedure:

1. Divide the students into groups of 4 or 5 and give each group a doohickey kit. Have each group organize the objects into categories, using their own classification scheme.
2. When everyone is finished, ask each group to explain their scheme. Which attributes did they use to place an object in a certain category (shape, color, type of material, other)? Compare and contrast how each group chose to classify their objects.
3. Explore with the students the idea that one classification system is not better than another. The utility of a given classification system depends on what the classifier wants to know.
4. Devise some simple questions that might be answered by classifying the objects in the doohickey kits. For example: What colors are present? How many different shapes are there (name them)? How might these objects be used? The students will need to regroup the objects based on the question asked.

5. Archaeologists study artifacts using the same techniques. They bring the artifacts back to the laboratory, decide what they want to know, and organize the data accordingly.



Closure:

1. Distribute a copy of "Artifacts From A Mining Camp" activity sheet to each team of students.
2. Have the students imagine they are archaeologists who have found an old mining camp. What questions might they ask about what happened in the past at this mining camp?
3. The students cut out the artifacts on the activity sheet. How might they classify these objects to answer their questions?
4. Summarize why classification is a useful tool for studying about the past.

Link:

Section Three, Lesson 17: "Artifact Classification"

Reference:

Hull, William P., 1970, "Attribute Games and Thinking Skills". In *The ESS Reader* by the Elementary Science Study of Educational Development Center, Inc., Newton, MA.





Artifacts from a Mining Camp

shovel	jacket	harmonica
pick	lunch box	3 rusted metal cans
old boot	1 fork	broken colored glass
nails	handkerchief	metal wash tub
miner's light	3 spoons	pocket knife
bed springs	boards	small wooden box cars
metal mug	rusted rail tracks	rusted pipe in hillside



SCIENTIFIC INQUIRY

SUBJECTS:	Science, social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Scientific inquiry, classification, research skills, writing
DURATION :	45 to 60 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objectives:

In their study of scientific inquiry students will use an activity sheet to:

1. Make an inference about the behavior of a classmate and test it using artifacts.
2. Simulate how archaeologists learn about past people by designing and conducting a research project.

Materials:

"Archaeological Inquiry" activity sheet for each student and group.

Vocabulary:

artifact: any object made or used by people.



Background:

The goal of archaeological research is to answer questions about people who lived in the past. Hypotheses formation and classification are dependent on the chosen question. For example, if we want to learn about a settler family's income we could hypothesize that more nonessential items than essential items means they had an income sufficient to buy luxury goods. We would classify the relevant artifacts into two classes—essential items and nonessential items. Based on the outcome of the classification we would accept or reject our hypothesis.

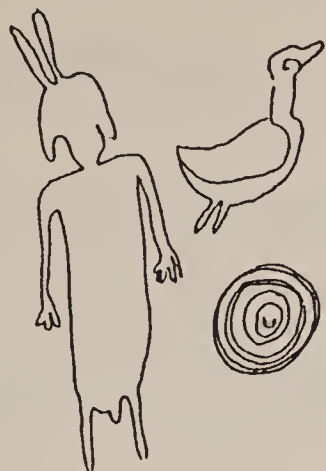


Setting the Stage:

Have students classify the contents of their own desks or lockers in whatever manner they choose. Items could be categorized as follows:

- A. Writing instruments
 1. pencils
 2. crayons
- B. Paper
- C. Books
- D. Miscellaneous
 1. gum
 2. money
 3. toys

Ask the students how they would proceed if they wanted to know something specific about the owner of a desk. This is how an archaeologist begins to study past cultures.



Procedure:

1. Distribute a copy of "Archaeological Inquiry" activity sheet which the students will fill in as they are led through the following inquiry.

2. The inquiry process begins with a question. Archaeologists want to answer questions about past human behavior and must use material remains to do so. Ask the students to consider the following question: "Is the owner of the desk next to you a saver or a thrower-awayer?"

3. **Formulate an hypothesis:** If there is a large amount of items not required for school work in the desk, then the owner is a saver.

4. **Classify the data:** Only two categories are essential—items required for school work and items not required for school work. Discuss with the students differing ideas about what constitutes "required items," since this determines how objects are categorized.

5. To answer the research question, ask which category contains the largest number of objects. If there is a greater number of items that are not required, then we **accept the hypothesis**: the owner of the desk is a saver. The students have made an **inference** about the behavior of the desk's owner and have tested their inference (hypotheses) using classified objects.

Closure:

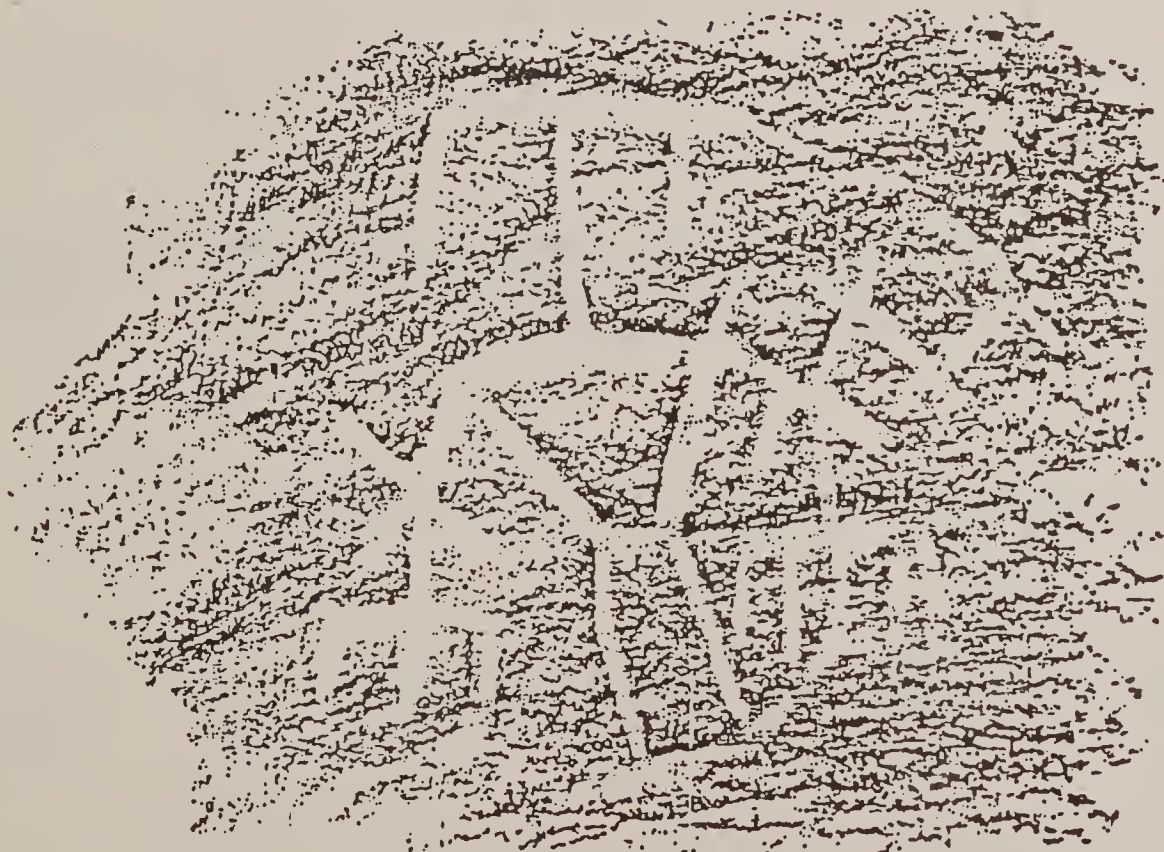
Divide class into groups of 3 to 5 students and give each group an "Archaeological Inquiry" activity sheet. Have them design and conduct an archaeological research project using objects in the school. Since students know the people in their class, it would be best to visit another teacher's room, the office, the lunchroom, etc. Each project must answer a question about the people who own or use the objects; e.g., what subjects are being studied at this point in time? Each group presents their results to the class.

Evaluation:

Students turn in their "Archaeological Inquiry" activity sheets for evaluation.

Link:

Section Three, Lesson 17: "Artifact Classification"

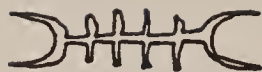


Archaeological Inquiry

Behavioral Question	Is the owner of the desk a saver or a thrower-awayer?
Hypothesis	If there is a large amount of items not required for school work in the desk, then the owner is a saver.
Classification Categories	items required for school work items not required for school work
Accept or Reject the Hypothesis	There is a greater quantity of items not required for school work than items required for school work, so I accept the hypothesis.
Make a Behavioral Inference	The owner of the desk is a saver.

**Archaeological Inquiry****Name:** _____

Behavioral Question	
Hypothesis	
Classification Categories	
Accept or Reject the Hypothesis	
Make a Behavioral Inference	



IT'S IN THE GARBAGE

SUBJECTS:	Science, social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Scientific inquiry, problem solving, discussion, forecasting, research skills, writing
DURATION:	60 to 90 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objective:

In their study of archaeological concepts, students will analyze garbage from different places to:

1. Demonstrate competence in applying the concepts of culture, context, classification, observation and inference, and chronology; and
2. Explain how their study of garbage relates to the methods of archaeology.

Materials:

Filled wastebaskets or small garbage bags from several places in the school, home, or elsewhere, selected to represent rooms of different function; plastic tarps are useful when spreading the garbage out. Undesirable and unsanitary items, such as used tissues or rotting food remains, should not be included. "It's in the Garbage" activity sheet for each group; "Garbage Chart" activity sheet for each group (optional).

Vocabulary:

artifact: any object made or used by humans.

chronology: an arrangement of events in the order in which they occurred.

context: the relationship artifacts have to each other and the situation in which they are found.

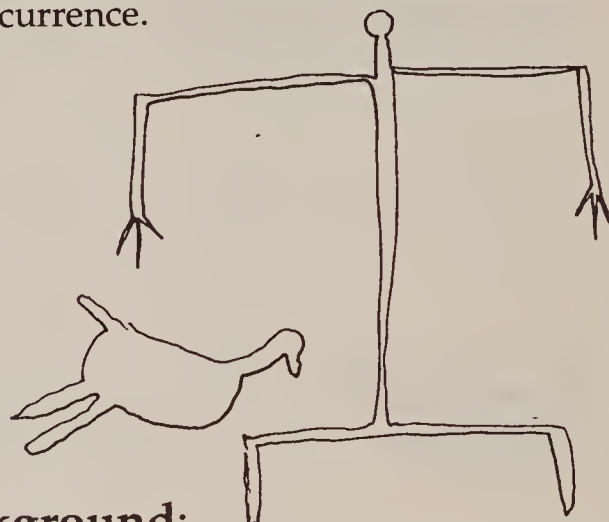
culture: the set of learned beliefs, values and behaviors generally shared by members of a society. "The way the members of a group of people think and believe and live, the tools they make, and the way they do things" (Braidwood, 1967, p. 30).

evidence: data which are used to prove a point, or which clearly indicate a situation.

inference: a conclusion derived from observations.

midden: an area used for trash disposal.

observation: recognizing or noting a fact or occurrence.



Background:

The unusable or unwanted remnants of everyday life end up in the garbage. By studying what people have thrown away, archaeologists can learn a great deal about a culture. This is true not only of prehistoric peoples who left no written record about their lives, but also of people today. Bill Rathje, an archaeologist, studies the garbage of Americans. He has learned many things about the relationships of human behavior and trash disposal, information useful in studying people of the past and the present. He has found that people will often tell an interviewer what they believe is appropriate behavior, but their garbage tells another story. People frequently say they eat lots of fruit and vegetables, yet their garbage shows they do not. Another example is that people say they recycle more than they actually do (Rathje, 1984, p. 27).

Just as we do not throw our trash any old place, neither did prehistoric people. Their garbage heaps are called middens, and are a rich source of archaeological information about their lifeways. Layers of trash also tell a story over time. Archaeologists excavate middens slowly and carefully, recording the location of each artifact and sample recovered

from the midden. They analyze the tiny fragments of prehistoric meals (bone slivers, seed hulls, plant parts) and charcoal from cooking fires. The animals and plants these remains came from can be identified and archaeologists can learn very precise information about the economy of past people.

If a midden is disturbed and the layers mixed, it becomes impossible to interpret the lifeways of past people. Vandals looking for artifacts dig in middens and they destroy irreplaceable information about the past. They tear pages from the history book of time. Everyone can help by not digging archaeological sites or collecting artifacts, by refusing to buy artifacts from people who do, and by always reporting anyone seen digging at sites or collecting artifacts to law enforcement.



Setting the Stage:

A famous anthropologist, Franz Boas, reportedly said "... man never lies to his garbage heap." What do you think your family's garbage could tell about you? (Examples: family size, income, preferred foods and activities).

Procedure:

1. Review the concepts learned in Section One: **culture**, **context**, **observation-inference**, **classification**, and **chronology**. Students will be applying these concepts to their study of garbage.

2. Explain to the students that they are going to be archaeologists, analyzing garbage (middens) to learn about the people who threw it away. Demonstrate some of the information that can be learned from garbage by examining a small amount of trash from your classroom trash can:

a. What **culture** is this garbage from? Could the garbage be mistaken for that of another culture? Is the garbage in your classroom trash the same or different from classroom garbage in China? Portugal? Your town 100 years ago? Are basic human needs represented in the trash?

b. What can you **infer** about the behavior of the thrower-aways and the origin of the garbage based on your **observations**? Is cafeteria trash the same as that from the wood shop? the library? How is a single person's garbage different from that of a family with many children? Is a vegetarian's trash different from a meat-eater's?

c. Arrange the trash in **chronological** order. On the bottom is the oldest trash, on the top is the most recent garbage. If you find dated items through the trash, such as newspapers or post-marked envelopes or product dates, you can establish a precise date for the trash.

d. Sort the trash into piles based upon some type of similarity. This is a **classification**, perhaps including categories like paper, food containers, other office supplies.

e. The trash is obviously from a classroom because you have preserved its **context**, the relationship artifacts have to each other and the situation in which they occur. If you went to your town's landfill, you might find some of the artifacts from your classroom trash but you could not interpret it as coming from your classroom because it has been all mixed up with trash from many other places. Its context has been lost.

3. Divide the class into groups of 4 to 6 students and give each group a bag of trash. The group analyzes their trash using the activity sheet "It's in the Garbage" (and optionally the "Garbage Chart").

4. Students visit each other's "middens," and a spokesperson from each group presents a summary of their findings.

Closure:

Lead a discussion using the "Garbage Concepts" questions.

Evaluation:

Collect the students' activity sheets and reports.

Links:

Section Three, Lesson 16: "Stratigraphy and Cross-Dating"

Section Three, Lesson 17: "Artifact Classification"

References:

Rathje, William L., 1984, "The Garbage Decade." *American Behavioral Scientist* 28(1), pp. 9-39.

Rathje, William L., 1991, "Once and Future Landfills." *National Geographic* 179(5), pp.116-134.



GARBAGE CONCEPTS

Question:

[When students propose an inference about the people who generated the garbage] What would the activity you are proposing (hypothesis) look like archaeologically? What artifacts would you expect to find if your hypothesis is correct?

Does your study of your garbage tell you everything about American society? Why or why not?

Do the contents of your garbage can change throughout the year? ... as a result of special occasions like birthdays or company for dinner? What mistakes might an archaeologist make about your family if he/she studied only the garbage from those special events?

How would the results of your study be different if we had mixed your individual garbage bags all together into one heap?

Concept:

When archaeologists suspect a certain behavior was occurring, they make an hypothesis about what the archaeological evidence would look like. For example, we could hypothesize that people butchered large game where it was killed and only took the most desirable parts back to their village. In excavating the village, archaeologists would prove or disprove their hypothesis based upon the animal bones present.

One sample is only a glimpse into a complex society. Just as you only see a small piece of our culture from one sample, so too archaeologists see only a sliver of the past from one site.

Just as someone who wants to completely understand your family would study your garbage over a long period of time, an archaeologist studies many sites because one site cannot reflect the range of activities of a prehistoric society.

Context would have been lost, and only very general statements about the culture that generated the garbage could then be made. This is what happens when vandals dig up sites and say the artifacts are preserved, therefore, no information has been lost.





Name: _____

1. Could you tell when your garbage was thrown away? If yes, how? If no, why not?

2. List two or more inferences you can make about the person(s) who threw the trash away.

3. From where did your garbage come?

4. Which basic human needs does your garbage show are being met?

5. Name two or more of the categories into which you classified your trash.

6. How do you know this garbage is of this culture?

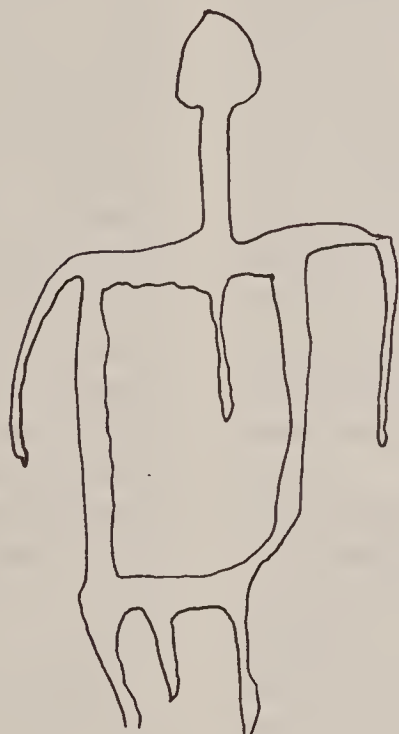


Name _____

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SECTION TWO

UTAH'S FIRST PEOPLE





INTRODUCTION

An archaeologist is a scientist who studies the cultures of people who lived in the past. By carefully studying artifacts and archaeological sites, archaeologists can determine how people lived (their culture). It is mostly from this evidence that the following cultural histories of six Indian groups, living in Utah prior to Euro-American settlement, have been recorded.

Ancient, historic, and modern people can all be studied using the methods of archaeology. Since information about Utah's historical period is readily available for students and teachers, Section Two concentrates on Utah's prehistoric cultures. It is an overview of Utah's prehistoric people, arranged in chronological order from most ancient to recent times. This review is a cursory examination of the salient features of each cultural group and will give students a sense of past lifeways, but it is by no means an exhaustive presentation of what is known. Several excellent publications are recommended in the "Resource Guide" for teachers and students wanting more in-depth information.

While this section is divided into cultural periods, bear in mind that these divisions reflect archaeologists' classifications. They may or may not correspond to prehistoric peoples' perceptions of their society and other societies. For example, the people archaeologists call the Fremont perhaps recognized three or four ethnic divisions amongst themselves. Conversely, they may have recognized no separation between themselves and the people archaeologists today call the Numic.

American Indian Considerations

The living descendants of prehistoric people on this continent are the American Indians; seven recognized Indian tribes live in Utah. It is important to realize that teaching this section is also teaching their ethnic history. Teach it with sensitivity and respect, as you would the story of your own ancestral past.

Also keep in mind that this unit is the archaeological view of their past, which is only one possible perspective. The scenario of the past as told by the things people left behind provides some informa-

tion about a culture—what people ate, what their homes were like, how their culture changed over time. However, archaeological methods cannot provide information regarding prehistoric people's thoughts, beliefs, and hopes. It is not possible to directly dig up religion, medicinal knowledge, kinship reckoning, dances, festivals, calendar-keeping, recipes, child-rearing practices, nor a multitude of other aspects of what it means to be human.

Native Americans have a rich tradition about their past and the details of their ancestors' lifeways, passed down from generation to generation through stories, ritual, religion, teaching, and myth. They sometimes have a view of their past that differs from the archaeological perspective. It is important to realize that the American Indian view and the archaeologist's view are two different ways of looking at the past—neither one is necessarily inferior or superior to the other. Archaeology makes inferences about the past based on a scientific analysis of material data. Scientific rules of evidence are applied. For many American Indians, the past embodies their heritage; a scientific view based on archaeological evidence is often not regarded as the most meaningful explanation of their cultural tradition.

Recently, there have been many examples of American Indians and archaeologists learning about each others' perspectives and the different kinds of information each group can provide about the past. Most importantly, both American Indians and archaeologists agree that sites and artifacts should be protected and that cooperation in saving the past is essential.

Certain issues, however, remain very sensitive, especially regarding human burials encountered by archaeologists as they excavate sites. Archaeologists often have been insensitive to the spiritual and religious beliefs of American Indian people, and unfortunate confrontations have occurred. Conversely, cooperation between archaeologists and Indian people in recovering the Shoshone burials eroding from the east shore of the Great Salt Lake in 1990 demonstrates how positive can be the relationship between the two groups.

While it is important to be sensitive to Native American cultural considerations, don't stereotype all Indian people as being closely connected to their traditional culture. Just as all Caucasians do not relate to a European heritage, Indian people have varying degrees of connectedness to their ancestral past. Also realize that there is no such thing as a single "Indian" culture. There were hundreds of Indian nations and languages in North America at the time of Euro-American contact. Today, Indian people can be as diverse in their views of an issue as is American society in general. There can be a range of opinions and lifeways practiced within one tribe, just as within any community.

Cautions

There is a danger of conveying two erroneous concepts when studying the distant past. One is the stereotyping of prehistoric people either as primitive and backward or, conversely, as noble savages living an idyllic life perfectly in tune with nature. The other misconception is that archaeologists are only interested in artifacts. Both misconceptions can be remedied by emphasizing that archaeologists study *people* in all their cultural variation. Archaeologists come to understand people by studying the artifacts they left behind, and objects are of interest because they are messengers of the behavior of past people. Objects viewed solely as mute things are of little use to archaeologists in deciphering the past.

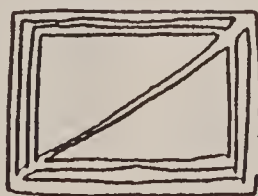
Like all people everywhere, prehistoric people exhibited an array of talents and personalities. Some were worriers, and some were light-hearted; there were born leaders and shy people, hardworkers and lazy folks. As a group, prehistoric people possessed incredible skill and understanding of their world—knowledge that enabled them to live successfully in environments that today seem inhospitable to us. Most of us would not survive a week in the wilds without the accompaniment of many pounds of

modern technology. The natural world was the Indian's pharmacy, grocery, department and hardware store, supplying food and raw materials for all manner of things, from baskets to houses to medicine and clothing. Prehistoric people had a deep and special knowledge of their world, and this fact cannot be trivialized if we are to perceive them accurately.

It will become obvious after studying this section how little we really understand about the people who lived here millennia before us. The data archaeologists rely upon to tell us the story of the past is fragile, very prone to loss, and is disappearing at an alarming rate. A theme to emphasize throughout this section is the role every person can play in protecting archeological resources so that the data will be available to help us fill in gaps in our knowledge. It is illegal to collect artifacts and to dig in Indian ruins or historic sites on public lands. Don't encourage others to destroy the past by buying artifacts. Report violations you witness to law enforcement authorities or land-managing agencies, such as the Bureau of Land Management, the U.S. Forest Service, and the National Park Service.

Archaeological Teaching Kit

A **teaching kit** prepared by the Utah Statewide Archaeology Society is available on loan from the Utah Division of State History and other agencies around the state (refer to Appendix 3: "Resource Directory"). The kit contains examples of artifacts from prehistoric cultures in Utah. All items in the kit are meant to be picked up and handled. Teaching this section along with using the teaching kit is highly recommended; it provides a concrete, vivid experience for students about lifeways that have no representation in their experience. The Division of State History will also loan a mano, metate, and corn, which students can use to experience grinding grain.



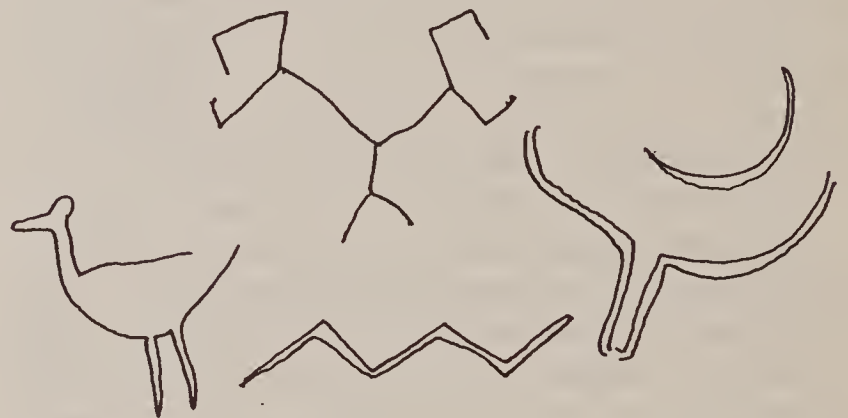


TEACHING OPTIONS FOR SECTION TWO

Each lesson in Section Two can be taught independently, or Section Two can be taught as a whole unit. Suggested activities for each alternative follow. The independent activities proposed for single lessons can also be used as unit activities.

Activities for Single Lessons

- The prehistory unit is written to emphasize the humanity of past peoples. For each lesson, you might use cooperative teams and strategies to challenge students to think about the special skills and knowledge that the presented lifeways required. This might be done using the following questions: How were these people the same as I? How were they different? What might have concerned them, delighted them, frightened and exhilarated them? What contributions have American Indians made to our American way of life?
- One way the stories of past people are pieced together is through an archaeologist's study of artifacts and sites. To demonstrate this concept, ask the students to read an essay and be prepared to: (1) list items (artifacts) that were found by archaeologists which helped them piece together the cultural story of these people; and (2) explain what part of the story each artifact helped to reveal.
- Students might be asked to imagine how ancient people solved problems, and then be asked to share this information in a skit, role play, diorama, drawing, demonstration, report, or chart. Problem-solving questions they might consider are:
 1. How did Paleo-Indians kill a huge mammoth with hand-held weapons? Some ideas to consider during problem solving are: the size of the mammoth, its reaction to being hunted, the importance of placing the spearhead just right, etc.
 2. How did the Archaic and the Fremont people find, gather, and store food? Some ideas to consider during problem solving are: the environment and available resources, the need for weapons, the distance traveled to food sources, the harshness and restrictions of winter, etc.
- 3. How did the Anasazi build communities high in the cliffs? Some ideas to consider during problem solving are: heights, tools, distance from a water source, hauling of materials to and from the location, etc.
- 4. How did the Numic and Navajo people adapt to the arrival of Euro-Americans? Some ideas to consider during problem solving are: the loss of available land, disease, herds of horses and cattle grazing consuming seed resources, etc.
- Read the essay and complete the quiz, as a class, team, or individual.



Activities for a Unit of Study

The following activities are grouped by thinking skills identified in Bloom's Taxonomy (Bloom, 1956). The activities within each skill category are designed to meet the needs of a variety of learning styles. This model is adapted from Butler (1984). Each activity is only an example of what is possible. Feel free to adapt these ideas.

The activities might be used in a variety of ways. For example, students might:

1. Complete one project from each thinking skills category.
2. Complete one or more projects from any category of their choice.
3. Divide into cooperative teams and complete one or more activities from an assigned thinking skills category.

Knowledge and Comprehension

- Using the "Technology Through Time" activity sheet, list appropriate examples of each type of technology (weapons, houses, food production, containers) used by each cultural group. Illustrate changes in each type of technology through a visual timeline.
- Pretend you are an archaeologist, and create:
 1. A brochure describing the importance of artifacts for understanding the past.
 2. An essay on why archaeologists know more about the Anasazi than they do about the Paleo-Indian people.
 3. A report describing the changes in Indian lifeways from the Paleo-Indians to the Numic and Navajo cultures.
- Pretend you are a travel agent with a time machine. Create a six-act play that highlights a trip back in time through the six prehistoric cultures of Utah. Show your play to another class or group of people.
- Make a webbed map showing characteristics of each prehistoric culture. Share your map with another class or group of people.

Application and Analysis

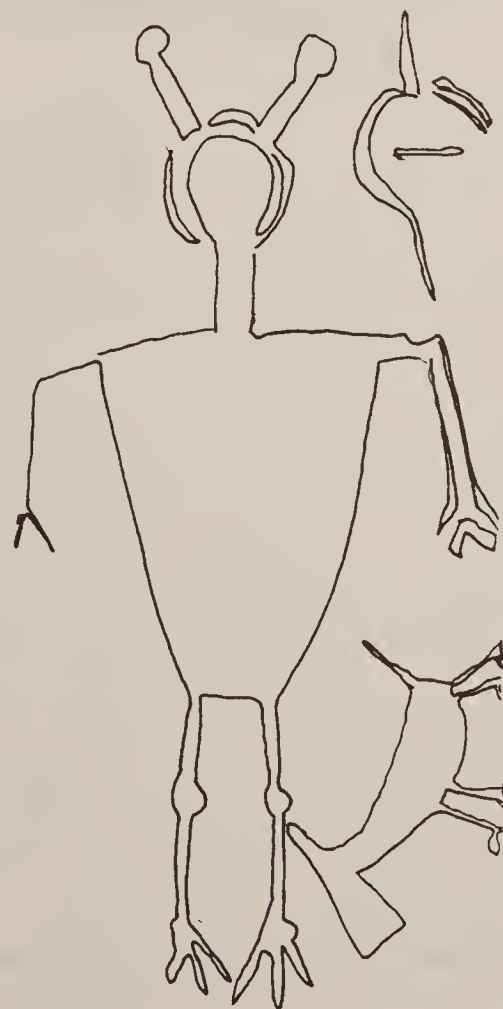
- Make a timeline, chart, or computer spreadsheet showing the most important events or technological changes of each culture.
- Prepare a lecture designed to convince the residents of a Utah community of the need for protecting archaeological sites for the purposes of future research and public enjoyment. Contact a community group and present your lecture to them.
- Interpret the need for conserving ancient archaeological sites for future research and public enjoyment through the eyes of an American Indian, archaeologist, or tourist. Role play each group through the monologue of a character.
- Brainstorm a list of ways a tourist might enjoy visiting archaeological sites for the purpose of learning about people of the past, without looting or vandalizing sites. Put these ideas into a newspaper article or public service announcement for TV or radio.

Synthesis and Evaluation

- Develop a questionnaire to determine people's thoughts or feelings about the importance of studying past cultures and the importance of protecting archaeological resources. Report your findings in the form of a graph or chart. Create a summary statement describing your findings. An example of a question might be: Would you

be willing to donate a week's allowance to help preserve an archaeological site for study by archaeologists? Communicate your findings to an agency that manages sites, such as the BLM or Forest Service.

- Write a persuasive speech or debate one of the following propositions. (Refer to Lesson 28: "Artifact Ethics" for further debate ideas.) Think of reasons to support or refute each statement. Take a position and try to convince others of your beliefs.
 1. Archaeological sites should be left undisturbed by archaeologists in order to protect places of spiritual importance to the Indian people.
 2. Society has a right to benefit from the scientific information contained in an archaeological site.
- Imagine you are an American Indian who feels a connection with the prehistoric sites near your home. In a verbal, written, or visual presentation, describe why the protection of these ancient sites is or is not important to your culture.
- Invent a board game in which three to five archaeologists search for information about the past. During the game the players encounter looters, collectors, American Indians, archaeologists, and other groups interested in ancient sites. Or, invent a board game that teaches about the lifeways of the six prehistoric cultures.



ADDITIONAL ACTIVITIES

Cooperative Learning

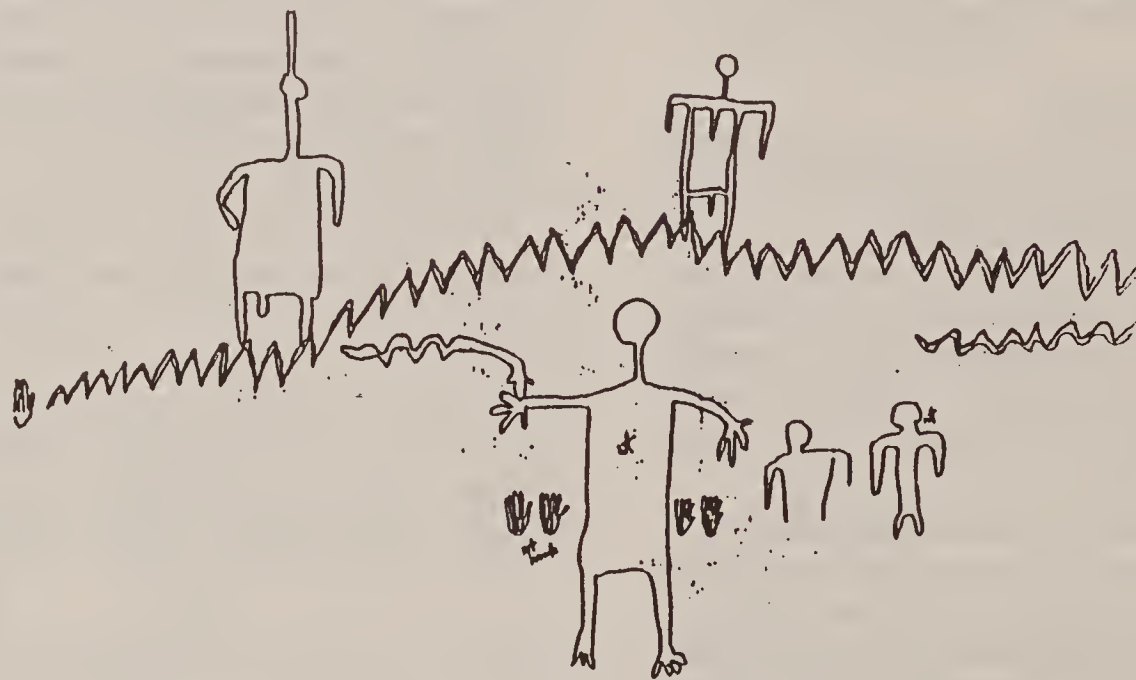
1. Assign roles within each team. Example: reader, recorder, on-task coordinator, presenter.
2. Give each team a copy of a prehistoric culture essay to be read in their group.
3. Assign each team a role. Example: archaeologist, collector, American Indian, tourist.
4. Students prepare a proposal, from their assigned point of view, for managing sites. Their proposal should answer the questions who, what, where, when, why, how. Give the students a variety of ways to present their proposals (chart, advertisement, skit, speech, song, poetry, diorama, letter) depending on the audience the proposal will be presented to (e.g., the BLM, the Forest Service, politicians, citizens, other students, a newspaper).

Archaeology and/or Culture Fair

Providing an opportunity for children to share or teach what they have learned is an important learning experience. An archaeology or culture fair could be used as a culminating activity. If children are aware of the fair at the start of their studies, they will be better prepared to help with decision making and planning in all aspects, including the products they create and the fair itself. Many of the preceding activities could be shared, as well as products from other lessons within the guide. Be sure to invite media reporters, local government and political officials as well as archaeologists to your fair.

References:

- Bloom, Benjamin, 1956, *Taxonomy of Educational Objectives, Handbook One: The Cognitive Domain*. David McKay, New York, NY.
- Butler, Kathleen, 1984, *Learning and Teaching Style in Theory and Practice*. The Learner's Dimension, Columbia, CT.



Technology Through Time

Technology	Paleo-Indians	Archaic	Fremont	Anasazi	Numic	Navajo
Weapons	Spear	Atlatl	Bow and arrow	Bow and arrow	Bow and arrow	Bow and arrow
Housing	?	Caves	Pithouses, caves	Pithouses, pueblos	Wickiups	Hogans
Food	Big game (Bison)	Wild seeds, game	Wild plants & animals, corn	Corn, beans, squash, game animals, turkeys	Seeds, roots, game animals	Maize, hunting, sheep
Containers	?	Baskets	Baskets, pottery	Baskets, pottery	Baskets, pottery	Pottery



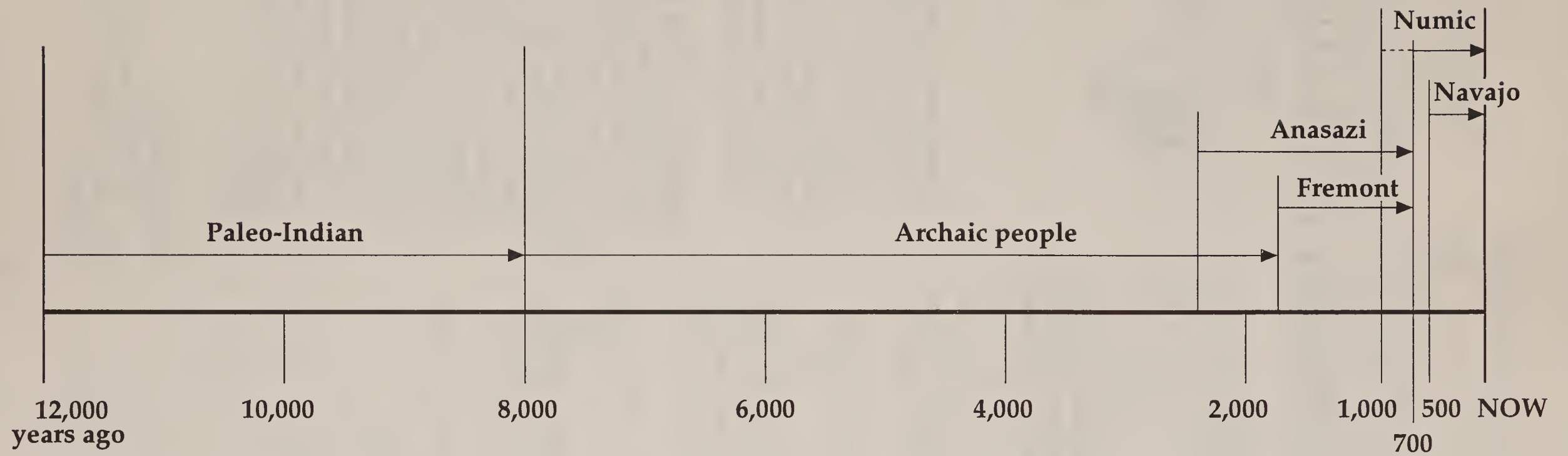
Technology Through Time

Name: _____



Technology	Paleo-Indians	Archaic	Fremont	Anasazi	Numic	Navajo
Weapons						
Housing						
Food						
Containers						

Timeline





THE PALEO-INDIANS

Teacher's Supplement

Vocabulary:

Clovis point: a type of stone projectile point made by early Paleo-Indians for use as a spear tip, characterized by a short, shallow channel on one or both faces, and larger than a Folsom point.

diagnostic artifact: an item that is indicative of a particular time and/or cultural group; a computer would be a diagnostic artifact of the modern age.

flintknapping: the technique of making stone tools from natural stone.

Folsom point: a type of stone projectile point made by later Paleo-Indians for use as a spear tip. Characterized by a long, shallow channel on one or both faces, and smaller than a Clovis point.

mammoth: an Ice Age animal related to the African elephant.

megafauna: literally, large animals; applied to the now extinct animals of the Ice Age, including mammoths, giant ground sloths, and short-faced bears.

Paleo-Indian: the name given to the oldest known cultural group in Utah.



Pleistocene: the Ice Age; the epoch of geologic time from 1.6 million years ago to 10,000 years ago, characterized in North America by periods of glacial advance and retreat.

projectile point: the stone point attached to the end of darts, spears, and arrows. Often erroneously termed "arrowheads." In historic times, some people made metal projectile points.

Summary of Key Points:

- Paleo-Indian people arrived in North America by 12,000 years ago, during the Pleistocene, probably crossing the Bering Land Bridge from Asia to Alaska.
- Paleo-Indians hunted megafauna, such as mammoths, but also relied on plants and small animals for food. They made distinctive spear points called Clovis, Folsom, and Eden points.
- The climate changed dramatically at the close of the Pleistocene, megafauna became extinct, and Paleo-Indian people adopted an Archaic lifestyle by about 8000 years ago.
- Paleo-Indian archaeological sites are especially fragile and easily destroyed. Everyone can help preserve sites and information about past lifeways by not collecting artifacts or digging sites.

Extension:

The Utah Museum of Natural History has a fine Ice Age exhibit, including a display of Ice Age animals.

References:

Fagan, Brian M., 1980, *People of the Earth*. 3rd ed. Little Brown and Co., Boston, MA.

Martin, Paul S., 1986, "Refuting Late Pleistocene Extinction Models." In *Dynamics of Extinction*, edited by D.K. Elliott, pp. 107-130. John Wiley and Sons, New York, NY.

Mehringer, Peter J. Jr., 1986, "Prehistoric Environments." In *Great Basin*, edited by Warren L. D'Azevedo, pp. 31-50. Handbook of North American Indians, vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

The Paleo-Indian People Activity Sheet Answers

1. a. (F) b. (T) c. (T) d. (T) e. (F) f. (F) g. (T) h. (F)
2. A Clovis point is diagnostic of the Paleo-Indian culture. We have very little information about the Paleo-Indian people, and removing a Clovis point from a site means that archaeologists may not be able to identify it as a Paleo-Indian site. Information about these ancient people, contained in the site, is therefore lost to us.
3. They left little behind for archaeologists to study because (1) their population was small, (2) they lived a mobile lifestyle, and (3) they did not build lasting homes; the sites are very old, so they have been subject to (4) erosion, (5) burial, (6) decay, and (7) disturbance by later people for thousands of years.
4. How to hunt, kill, butcher and preserve the meat from large animals; the habits of game animals; how to flintknapp spear points; where to find stone for toolmaking; edible plants and their location and season of ripeness; knowledge of a large geographic area.



THE PALEO-INDIAN PEOPLE

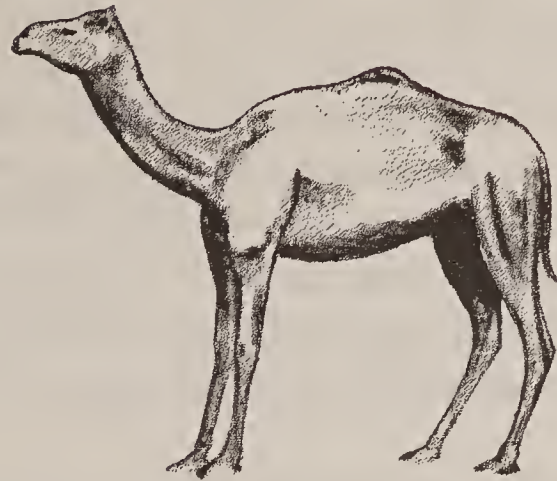
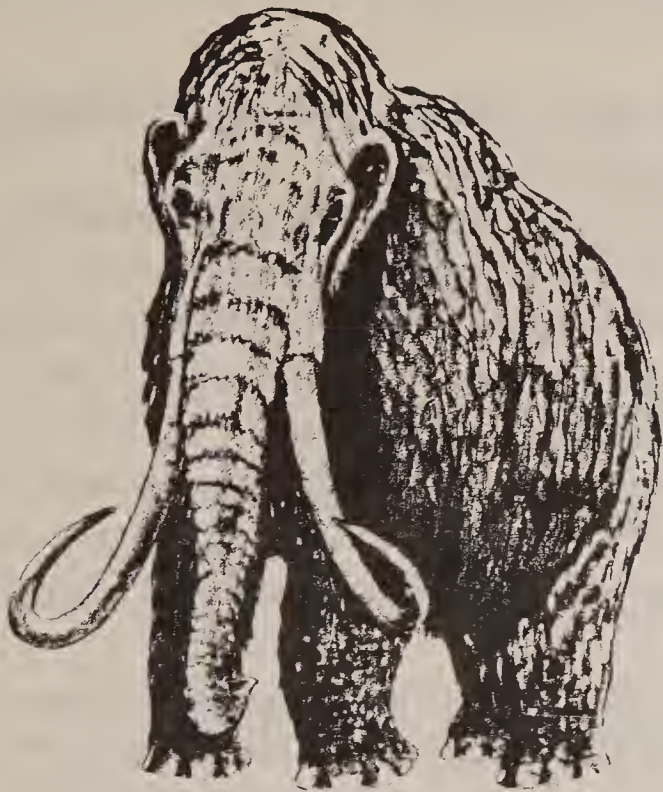
The earliest known people in Utah are called by archaeologists the Paleo-Indians (paleo meaning ancient). They lived all over North America and first appeared in Utah about 12,000 years ago. The Paleo-Indians probably came to North America from Asia by traveling across Beringia. Beringia was located where the Bering Sea is today. During the late part of the last Ice Age, called the Pleistocene epoch, a lot of the earth's water was frozen in glaciers. This caused a lowering of the sea. This lower sea level exposed a strip of land, called the Bering Land Bridge (Beringia), which connected Asia and North America. It is believed that the Paleo-Indians used this route to move into North America.



Map showing location of Utah and Bering Land Bridge between Asia and North America

Archaeologists know about the Paleo-Indians from uncovering evidence at sites where the Indians killed and butchered large animals, especially the mammoth and a now extinct species of bison. Mammoths were enormous animals, a relative of the African elephant. They grew as much as 13 feet tall and could weigh more than 7 tons. Mammoths were vegetarians and ate grasses and shrubs. They were well adapted to cool climates. Other animals that lived during this time were a giant ground sloth, giant short-faced bear, camel, saber-toothed tiger, tapir, and the Ice Age horse. Large animals of this period are called megafauna.

The environment changed a lot during Paleo-Indian times. Before 12,000 years ago there were many lakes joined by rivers full of fish. The land was lush with trees and grass on which herds of camels, horses, and mammoths grazed. Then 12,600 to 10,600 years ago, the climate began to warm, causing the lakes to shrink, many rivers to stop flowing, and springs to dry up. One of these lakes, Lake Bonneville, which

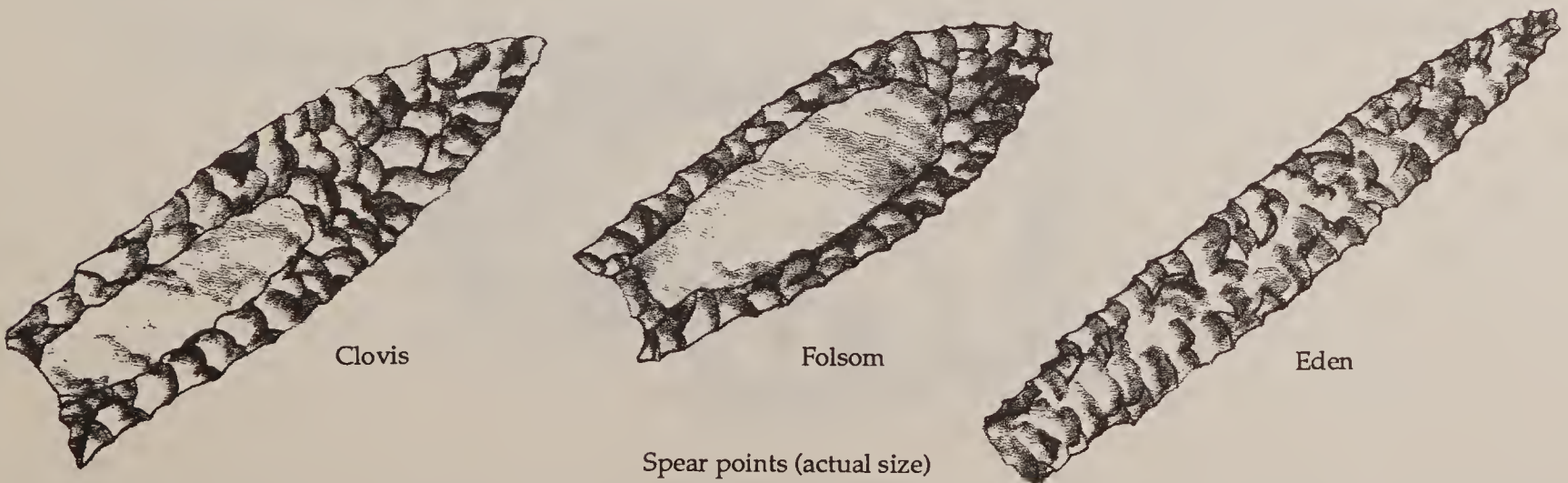


Mammoth and Pleistocene camel

had covered much of western Utah during the Pleistocene period, began to shrink and became what we now call the Great Salt Lake. Many plants and animals died, disappearing with the shrinking glaciers. Other animals faced extinction either from the climate change or from hunting by the early people. As many as 78 species of mammals became extinct during the last Ice Age. Different plants and animals began to live in a warmer and drier Utah. Over time, the changes in climate and in plants and animals caused gradual changes in the lifeways of the Paleo-Indian people.

Archaeologists do not know very much about the lifeways of the Paleo-Indians. There are several reasons for this. The population of Paleo-Indians was very small, and they moved around a lot, harvesting wild plants and animals. They did not leave very many remains behind, unlike later cultures who lived in more permanent villages. Paleo-Indian sites are very ancient and have been exposed to many destructive forces over a long time. Erosion, burial, decay, and disturbance by later people have made it difficult for archaeologists to find Paleo-Indian remains.

The artifacts of Paleo-Indian people most often found are different types of spear points. Two kinds of points are Clovis points which come from an earlier time and Folsom points which come later. Both points are called fluted points because of a shallow lengthwise channel on one or both faces of the point. Archaeologists are not sure about the purpose for this channel, but they have several ideas. Maybe, it made it easier to haft (attach) the point to a spear. Perhaps, like the channel of a bayonet, it caused the animal to bleed more, hastening its death. Since spears were thrust in



Clovis

Folsom

Eden

Spear points (actual size)



again and again to kill the animal, the groove may have made it easier to remove the spear; or the flute may simply have been a favorite style of point.

Archaeologists have some evidence that leads them to believe the Paleo-Indians lived in Utah. Paleo-Indian people are best known as hunters of big game, or megafauna, such as mammoths and *Bison antiquus*, an extinct form of buffalo. Several famous sites in North America contain mammoth bones with spear points beside or embedded in them. Archaeologists have uncovered several mammoth skeletons and many Clovis and Folsom points in Utah; however, no sites with points and megafauna together have been discovered. Petroglyphs (figures pecked on stone) of mammoths have been discovered though, so we know that Paleo-Indian people were in Utah before mammoths became extinct.

After about 10,000 years ago, the evidence at archaeological sites begins to change. Archaeologists have discovered many different kinds of stone points, including a type called Eden points. The discovery of grinding stones used to process plant foods and the remains of a variety of mammals, fish and fowl suggest the Indians ate foods other than megafauna. By 8000 years ago, the lifeways of the Paleo-Indians had changed so much that archaeologists give this time period a new name, the Archaic period.

Archaeologists have many questions as they observe this change in lifeways over time. One question is: How important were foods other than megafauna to the Paleo-Indian? Since most of the archaeological evidence about Paleo-Indians comes from kill sites, there is a tendency to think of them only as meat-eaters, stalking large and dangerous animals. However, the Paleo-Indian people must have eaten a variety of plants and small animals as well. This and other questions about the Paleo-Indian are difficult to answer because of the limited evidence that can be found.

Hopefully, someday archaeologists will find Paleo-Indian sites that have been preserved well enough to tell a more complete story about how these people lived and how they adapted to a changing climate. People can help archaeologists have a better chance of finding this evidence by leaving artifacts where they find them and by not digging in archaeological sites. What if there was a site with a Clovis point on the ground surface, and someone came along and took the Clovis point home with them, without even notifying an archaeologist? A clue to the past would be lost forever. The information contained in these sites is so fragile, so easily destroyed, that archaeologists worry that they will never be able to learn more about those people from so long ago. If everybody remembers to leave artifacts and archaeological sites undisturbed, there is a much better chance that archaeologists will be able to solve the mysteries about these past people.



Mammoth petroglyph



The Paleo-Indian People

Name: _____

1. True or False?

- ___ a. Paleo-Indian people grew corn and lived in stone houses.
- ___ b. Paleo-Indian people were very skilled flintknappers.
- ___ c. Mammoths are similar to modern-day elephants.
- ___ d. The bison that Paleo-Indian people hunted were not the same type of bison that live today.
- ___ e. Paleo-Indian people probably ate nothing but meat.
- ___ f. Archaeological evidence about Paleo-Indians is plentiful.
- ___ g. One person could destroy the chances of knowing more about Paleo-Indians just by picking up a Clovis point from a Paleo-Indian site and taking it away.
- ___ h. The climate during Paleo-Indian times was warmer than the climate is today.

2. Write a paragraph about what you would tell somebody you saw taking a Clovis point. Be sure you give them a reason for what you tell them they should do.

3. Name two reasons we know so little about the Paleo-Indian people.

4. Imagine you are living in Paleo-Indian times. Describe two skills or pieces of special knowledge you would need to survive that you don't now have.



THE ARCHAIC PEOPLE

Teacher's Supplement

Vocabulary:

atlatl (AT-lat-l): a throwing stick, used to launch stone-tipped darts.

core: a prepared nodule of stone which a flintknapper strikes to remove thin flakes of stone; the remnant chunk of stone left after flintknapping.

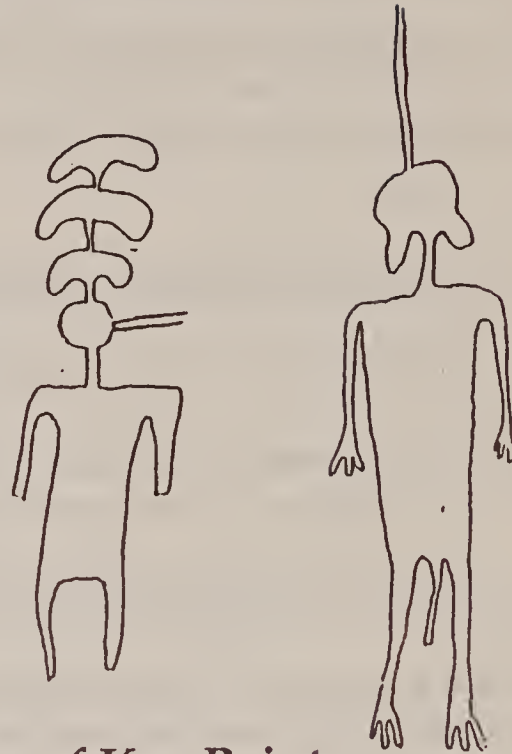
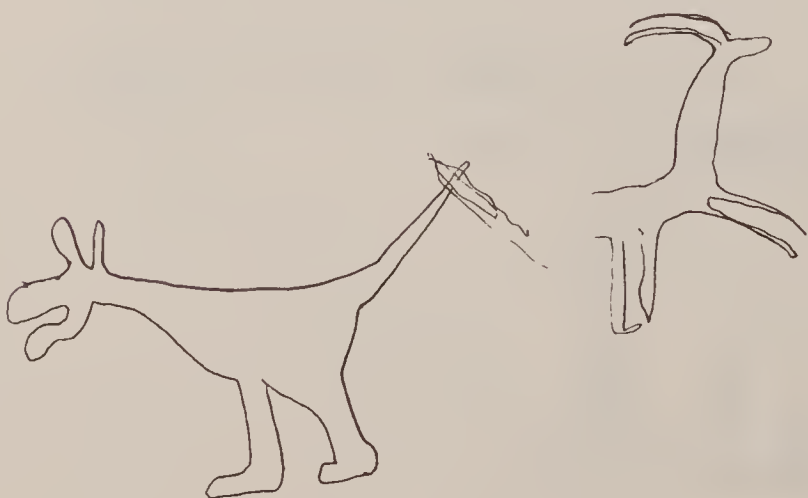
diagnostic artifact: an item that is indicative of a particular time and/or cultural group; a computer would be a diagnostic artifact of the modern age.

flake: a thin piece of stone removed from a nodule by striking it with a flaker made of bone, antler, or other stone. Flakes have sharp edges, and could be used as cutting implements. Flakes were also further shaped into tools or were left as waste by-products of flintknapping.

flintknapping: the technique of making stone tools from natural stone.

mano: the shaped, hand-held stone used to grind grains, nuts, seeds, and mineral pigments by moving it back and forth on a metate.

metate: a shaped stone slab used as a base upon which grains, nuts, seeds, and mineral pigments were ground with a mano.



Summary of Key Points:

- Desert (Archaic) Culture people lived in Utah from about 8000 to 1600 years ago. They lived a nomadic hunting and gathering lifestyle and were well adapted to climatic fluctuation.
- Desert Culture people had a vast knowledge of the natural world, the plants, animals, and mineral resources upon which their lifeway depended. They manufactured a wide array of tools and implements, including baskets and grinding stones.
- Most of what we know about the Desert Culture people comes from cave excavations, but caves were only inhabited for part of the year. We do not have a representative picture of Archaic lifeways since caves provide only part of the story.
- Archaeologists need the help of everyone in preserving sites. If people continue to dig sites and collect artifacts illegally, archaeologists will not be able to study the past and address research topics such as understanding Desert Culture peoples' year-round lifeways and how people adapted to a changing climate.

Link:

Section Three, Lesson 22: "Experimental Archaeology: Making Cordage"

References:

D'Azevedo, Warren L. (editor), 1986, *Great Basin*. Handbook of North American Indians, vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Jennings, Jesse D., 1978a, *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers No. 98. University of Utah Press, Salt Lake City, UT.

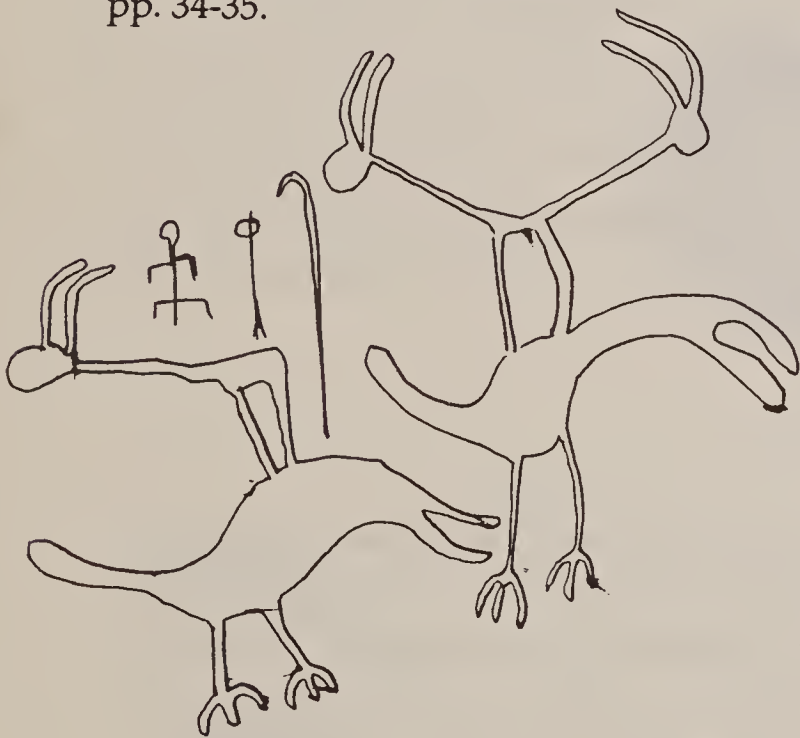
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Powell, Shirley, and George J. Gumerman, 1987, *People of the Mesa: the Archaeology of Black Mesa, Arizona*. Southern Illinois University Press, Carbondale, IL.

Illustration Source:

sandal - D'Azevedo, 1986, p.199

atlatl - Powell and Gumerman, 1987, pp. 34-35.



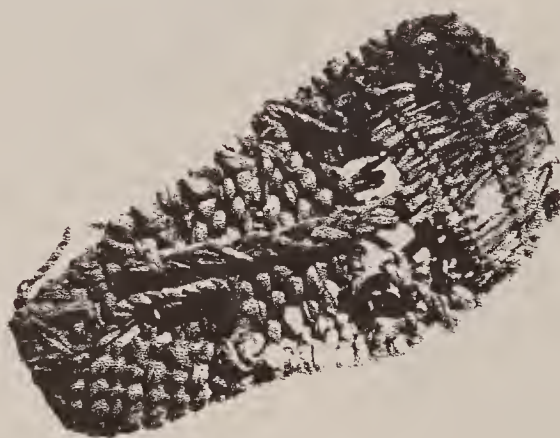
The Archaic People Activity Sheet Answers

1. Since Desert Culture people only spent part of the time living in caves, we understand only a portion of their lifeways from studying cave sites.
2. Desert Culture people are known for the many types of baskets they made, and baskets preserved well in cave sites.
3. Desert Culture people knew a phenomenal amount about their world and were just as intelligent as people are today.
4. Digging holes in cave sites disturbs artifacts and their context. Archaeologists then have a difficult time learning about past people since the evidence they left behind has been disturbed.
5. The rain and greater snowmelt might flood the marsh, and the cattail roots and duck eggs would then not be available. Your family will have to move elsewhere to look for food.
6. Vast knowledge of (1) locations and (2) seasons of plants and animals, (3) location of stone for making tools, (4) geographic understanding of a large territory, (5) great skill in making many kinds of baskets, and (6) stone tools, (7) skill in hunting game and preserving meat.

THE ARCHAIC PEOPLE

Archaeologists call the time period after Paleo-Indian times the Archaic period. This culture is found throughout North America. In Utah, archaeologists named these people the Desert Archaic, or Desert people. They lived here from 8,000 years ago up to 1,500 years ago in some places.

The Desert people experienced great changes in climate during the Archaic period. The warming trend that began during the Paleo-Indian times continued. From 8,000 years ago to 4000 years ago, the weather was warmer and drier than the Utah we know today. Then, around 4,000 years ago, the weather began to get cooler and wetter. The Great Salt Lake became bigger, creating a shallow lake in the West Desert. By the end of the Archaic period 1600 years ago, the climate was settling into a pattern much like Utah's weather today.



Sandal

The Desert Archaic people lived in small nomadic groups that moved from place to place throughout the year to harvest ripe plants and to hunt or fish. They knew a lot about the life cycles of probably hundreds of plants. They used these plants for food and for making baskets, clothing, medicine, nets, and mats. They knew the migratory patterns and habits of fish and animals and knew a great deal about the geography of a large area of land. With this knowledge they were able to find plants and animals, stones for making tools, and good campsites with firewood and water nearby. The Archaic people had the ability to make all the things they needed to survive year around. They created beautiful woven baskets and knew how to make them waterproof. They wove sandals and made nets and snares for capturing small animals. They also made fur robes, stone tools, and dart points.

The Desert Archaic people lived close to nature. Over the years, they adapted to the changing climate by learning about the new plants and animals that came to live in their land. For example, marshes have attracted people for thousands of years. Here they were able to find a supply of water which was also home to waterfowl and

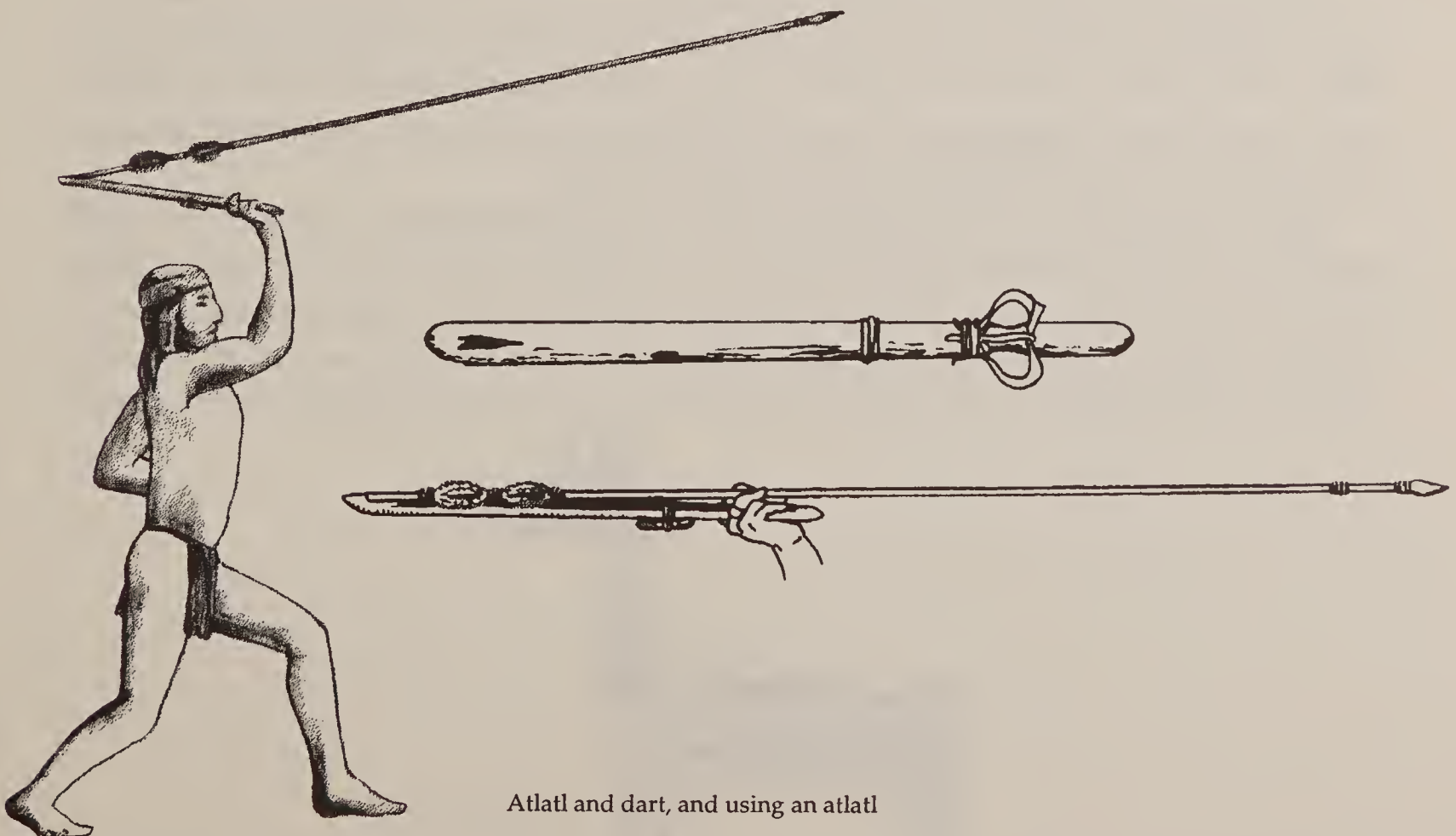
their eggs, as well as fish, game, and many edible plants. Archaic people could have lived comfortably near a marsh most of the time; but during a wet year the marsh could be flooded, making some or all of the food hard to find. The Archaic people then had to find a new source of food. Perhaps people moved to the uplands and spent more time hunting game, or to pinyon forests to harvest pine nuts, or to a lake to fish. These different ways of surviving required the use of different kinds of knowledge and skills in addition to different kinds of utensils, tools, and weapons.



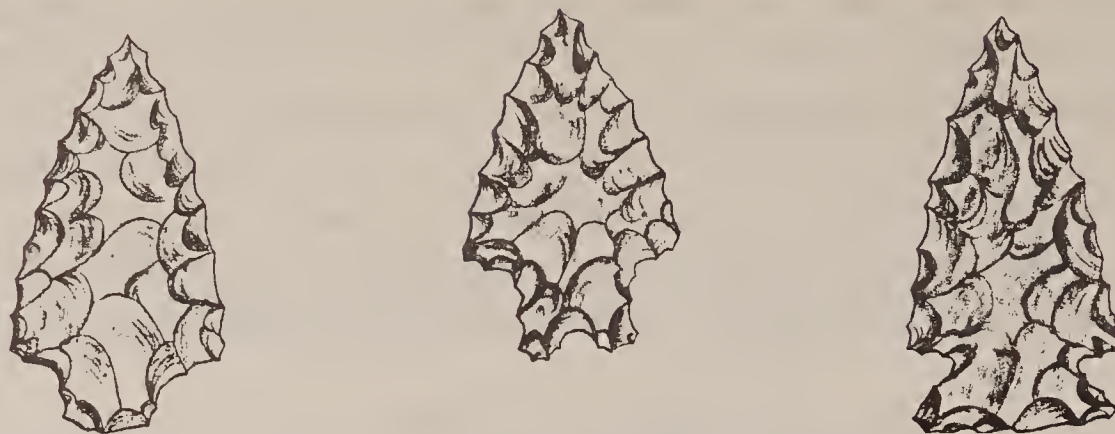
Mano and metate

Perhaps the most important tools of the Desert people were their baskets and grinding stones. They collected, cooked, stored, and ate a variety of seeds and nuts, which are very nutritious foods. The seeds and nuts were ground into a paste or flour on a metate, a slab of shaped stone. A hand-held smaller stone, a mano, was moved back and forth over the nuts or seeds on the metate. The flour could then be cooked as a mush or gruel by stirring it in a basket of water, then heating it by placing hot stones from a campfire into the basket.

The Desert people were also hunters. They hunted using an ingenious weapon—the atlatl (AT-lat-l), or throwing stick. A dart with a stone point on one end was laid on the atlatl, then held over the shoulder. The hunter launched the dart by holding



Atlatl and dart, and using an atlatl



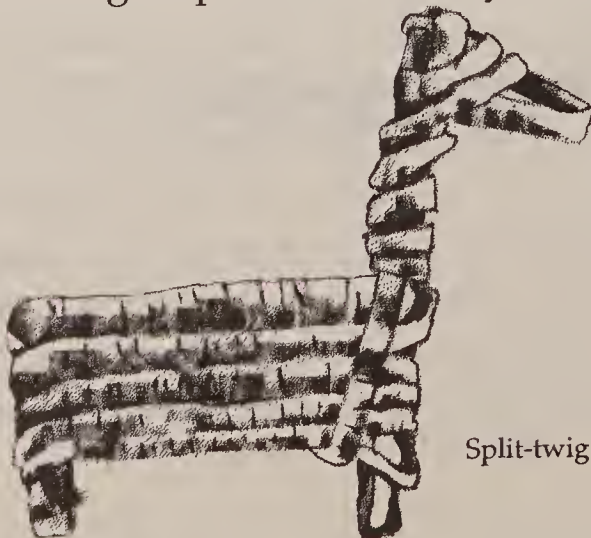
Atlatl dart points

onto the atlatl and propelling it forward, shooting the dart further and harder than possible without the atlatl. The atlatl functioned as an extension of the hunter's arm, so he or she had more power behind the throw. Some of the common dart point types of the Desert people are called Silver Lake, Pinto, Elko, and Gypsum projectile points. Flakes are the debris from flintknapping, and a core is the piece of rock remaining after the flintknapper has removed the piece of stone he or she wants to manufacture into a tool.

Most of what is known about the Desert people comes from excavated sites in caves or rock shelters. Two of the most famous cave excavations are Hogup Cave and Danger Cave. Danger Cave is located in northern Utah, and is now a Utah State Park. Dry caves preserve artifacts and materials so well that archaeologists can learn a lot from them about past cultures and the changing climates. The dust and sand blowing into the caves covered up artifacts and living areas, leaving a new surface for later people who also left artifacts. These many surfaces where people lived are stacked up in the caves like pages of a book, and archaeologists can analyze the site a level (page) at a time to reconstruct the long story of the past.

Desert Archaic people lived in caves during the seasons when plants and animals were available nearby. Since they expected to return to the caves year after year, they often left supplies there for their next visit. Caches have been found that include hides, rope, mats, sandals, stone tools, grinding stones, and seeds, as well as nets and snares used to catch rabbits and other small animals.

Split-twig figurines have also been found. These figurines are in the form of small creatures and were made by bending and wrapping a split twig into a deer-like shape. Their function is not known, but they are often discovered in Archaic caves. Another special artifact found in caves is shell from the Pacific coast. Even in early Archaic times, people met other groups from far away and traded goods with them.



Split-twig figurine



Caves have taught archaeologists some things about Archaic people, but they do not tell their whole story. Archaic people lived only part of the year in caves, and the rest of their time was spent elsewhere. Little evidence has been found to help us learn about how the Archaic people lived in other places. For example, archaeologists don't know what kinds of houses they built although it seems they might have been similar to later people's wickiups (brush structures) and pithouses. Artifacts from locations other than caves are hard to find because their baskets, snares, mats, and other utensils did not preserve well in open, unsheltered sites.

Studying the Archaic people from cave evidence only is like trying to understand the life of an American grade school student by only looking at evidence found in his or her school classroom. We would understand some things about the person as a student but very little about other aspects of their life. We would have a much more complete picture of the student if we were able to study everywhere she goes, and observe everything she does. Likewise, archaeologists hope to have a clearer view of the Archaic people by finding and studying all the kinds of places where they lived. This can only be accomplished with the assistance of everybody helping to preserve sites.

Everyone can help preserve archaeological sites by following three rules:

1. Enjoy sites without digging or collecting artifacts.
2. Refuse to buy artifacts because that discourages the sellers from collecting artifacts and digging at sites.
3. Always report anyone you see collecting artifacts or digging sites to law enforcement people.



The Archaic People

Name: _____

Write a sentence explaining why statements 1-4 are false.

1. From studying cave sites, archaeologists have learned all there is to know about how Desert Culture people lived.

2. Archaeologists seldom find baskets in Desert Culture sites.

3. Desert Culture people were very primitive and were not as intelligent as people are today.

4. If people dig holes in Archaic cave sites, it doesn't really hurt anything.

5. You are living in Desert Culture times, and your family has been returning to a cave near a marsh every spring for 10 years to harvest cattail roots and duck eggs. It has been raining for three weeks now, and there was an unusually high snowfall this past winter. What are you concerned about?

6. Name two special skills or pieces of knowledge that Desert Culture people had which allowed them to survive.



THE FREMONT PEOPLE

Teacher's Supplement

Vocabulary:

ceramics: vessels made of fired clay.

cultigen: a plant which is dependent on humans to grow and reproduce.

pithouse: a type of structure built partly underground so that the earth forms all or part of the side walls.

Summary of Key Points:

- Fremont people lived in Utah from about 1600 to 750 years ago. There is much variety in Fremont lifestyles throughout Utah, but generally they were part-time farmers and part-time hunters and gatherers.
- Fremont people lived in pithouses and made pottery. They grew corn, beans, and squash, like their Anasazi neighbors to the south. They also used marsh resources.
- Fremont people hunted with bows and arrows. They made intricate human clay figurines, rock art, and baskets.
- Living in villages, instead of being nomadic, causes many social changes, among them the need for group decisionmaking, ways to resolve disagreements, labor specialization, as well as a growth in arts and the number and types of possessions.
- Settled farmers can have a more risky and laborious lifeway than nomadic hunters and gatherers.
- The largest Fremont village ever excavated was discovered because of the actions of a schoolboy. One person can have an enormous impact on saving the past.
- The fate of the Fremont people and their relationship to later Numic people is unknown. Everyone's help is needed to protect archaeological sites so that we will be able to answer questions about the past.

Extension:

Exploring the Fremont, by David B. Madsen, is an illustrated book about the Fremont, written for a general audience. It is recommended for upper grade levels.

References:

Jennings, Jesse D., 1978a, *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers No. 98. University of Utah Press, Salt Lake City, UT.

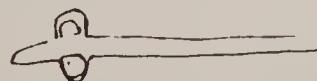
Jennings, Jesse D. (editor), 1978b, *Ancient Native Americans*. W.H. Freeman and Co., San Francisco, CA.

Madsen, David B. (editor), 1980, *Fremont Perspectives*. Antiquities Section Occasional Papers Vol. 7, No. 16. Utah Division of State History, Salt Lake City, UT.

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The Fremont People Activity Sheet Answers

1. Some elements that could be discussed include the desirability of having more possessions and living with many people versus the freedom of being able to move about easily and among fewer people. Settled life can be more risky than the flexible hunting and gathering lifeway.
 2. It is illegal to dig sites on public land. Digging in a cave site might destroy evidence of the relationship between Fremont and Numic people. Digging rearranges artifacts, and archaeologists then cannot reliably reconstruct the story of the past there. Illegal digging destroys the clues left by past people.
-

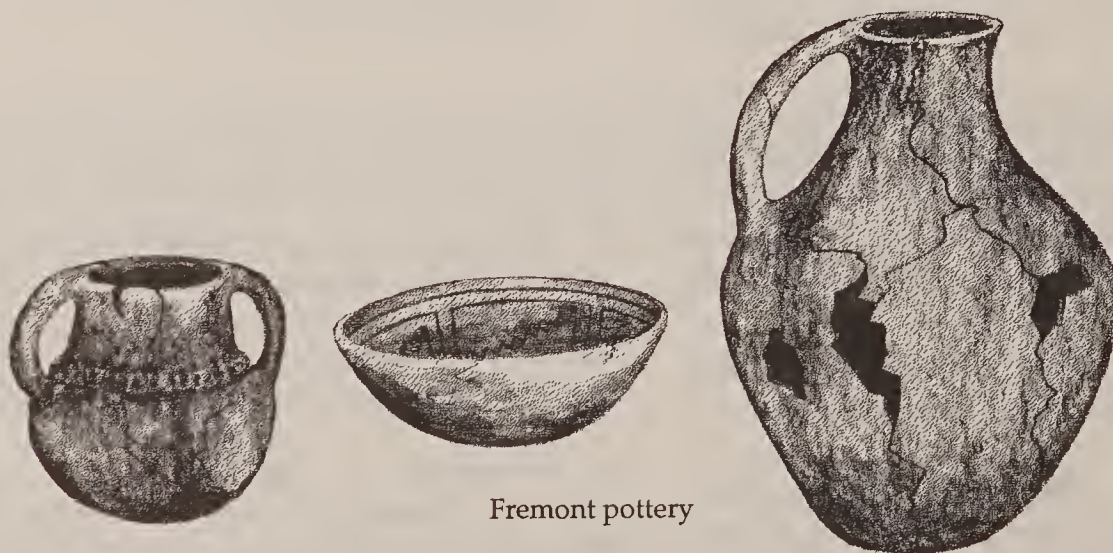




THE FREMONT PEOPLE

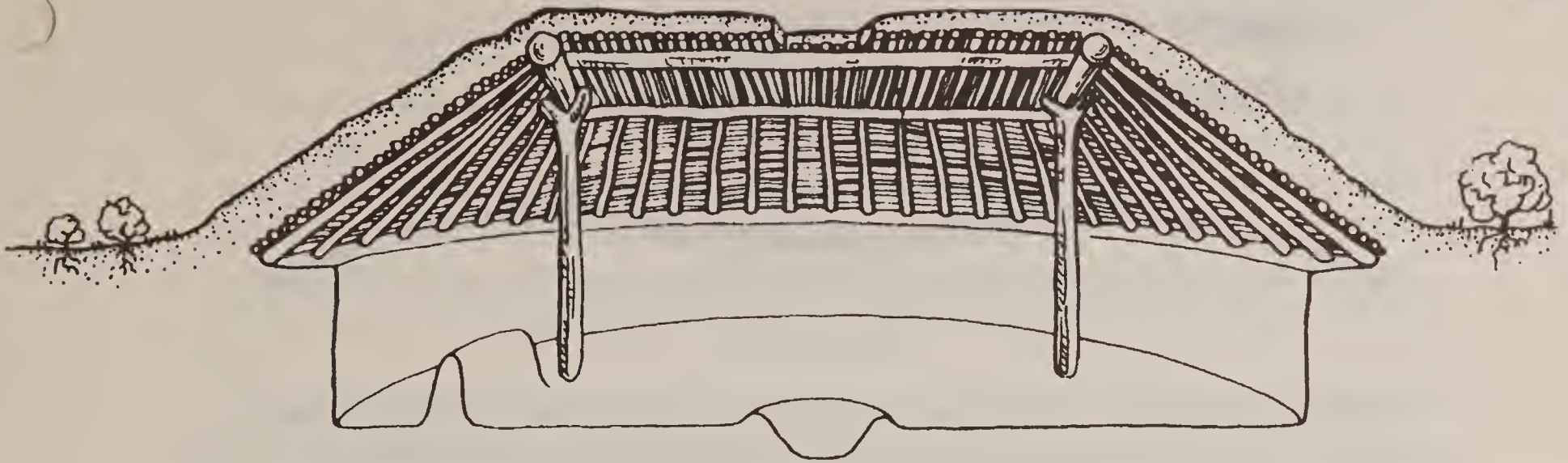
While a few Fremont sites are found in surrounding states, Utah was the homeland for Fremont people. The Fremont people lived in Utah from 1600 years ago to 750 years ago. They mostly lived in the area of the state north of the Colorado River. The Anasazi people were their southern neighbors. The Fremont and the Anasazi discovered new ways of living which were different from the Archaic people. They grew corn, beans, and squash; made pottery; built sturdy homes; and lived in villages. Corn was first grown in Mexico, and the seed and knowledge of how to grow it were brought northward to the home of the Fremont and Anasazi. Archaeologists have found evidence of corn being grown as early as 2200 years ago in Utah, but it was not a major source of food then. It seems that the earliest farmers planted small plots of corn but continued to live mostly on gathered and hunted wild foods.

The Fremont adapted to many different locations in Utah. They lived near, and depended upon, the marshes in Utah river valleys such as the valley where Richfield is today. They lived in farming villages, too. In the desert, part of the year, they continued to live in caves like Hogup Cave, which is west of the northern tip of the Great Salt Lake. Although the Fremont lived in different locations, they shared similar ways. They all made and used gray pottery, built pithouses, and probably grew some corn.



Fremont pottery

The Fremont people made a sturdy gray pottery in the form of bowls and narrow-necked jars, some with loop handles. Their pottery designs began to change around 1300 years ago. The people started to make painted types of pottery with beautiful geometric designs of black on a white or gray background. Fremont pottery is similar to Anasazi types in decoration, but each added a different kind of material to the clay (such as sand or crushed rocks) to make it stronger.

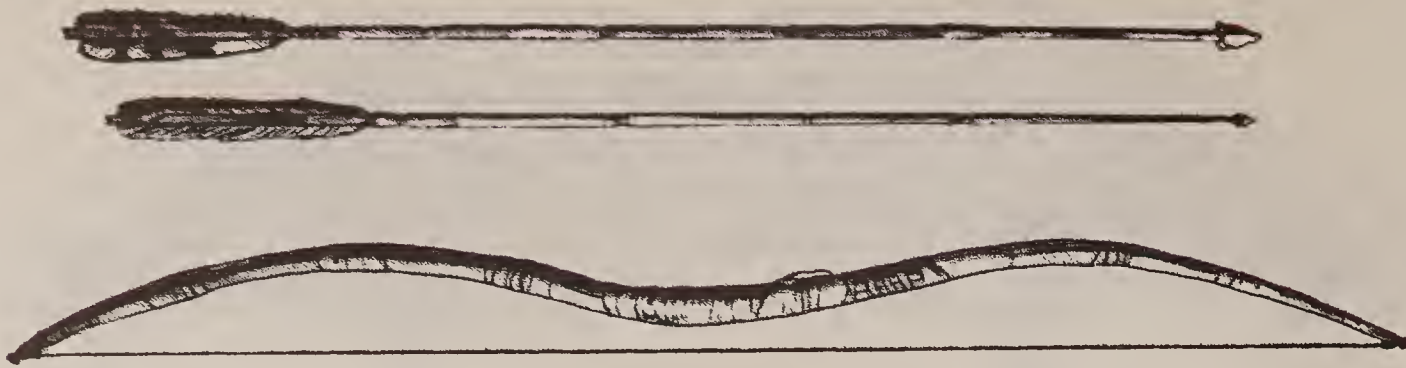


Pithouse

Pithouses were first seen during the earlier Archaic period, but pithouse villages became common during the Fremont period. Usually the villages were small; maybe only four to five houses were lived in at one time. Pithouses were difficult to build; however, the effort was worth it because they were easy to heat and keep cool. Using sharpened sticks called digging sticks, the Fremont began a pithouse by first digging a shallow round or rectangular hole, 4 to 7 meters (12 to 22 feet) across. Four upright beams set in the floor supported the roof, while smaller poles leaned against the roof to form sloping walls. Matting of sagebrush, juniper bark, or other plant fiber was woven through the poles and the whole structure was then covered over with earth and sealed with clay. Sometimes the base of the walls was lined with stone slabs or clay, or the walls were built of stone or adobe. Inside, a central fireplace was shaped of clay, with a rim around its edge. Directly above it was the smokehole opening. Many Fremont pithouses also had a ventilator shaft, a small tunnel that allowed fresh air to move through the pithouse and out the smokehole. The ventilators may also have been used for entrance ways. The Fremont stored corn and wild seeds in rodent-proof, surface storage rooms and granaries, often built into small cliff overhangs. These structures were made of stone and adobe mortar or were completely built of adobe.

Although the Fremont grew corn, beans, and squash, archaeological evidence shows that many of them were still hunters and gatherers of wild foods. The bones of deer, mountain sheep, bison, antelope, and rabbits as well as charred wild seeds and plant parts are often found at Fremont sites. They also ate insects, especially grasshoppers and crickets, which were nutritious, easy to gather and to store. (In fact, the settlers ate "desert fruitcake," a mixture of wild fruits and insects that they got from the Indians. It saved their lives in some cases and was reported to be tasty.) The Fremont made unique baskets which were probably used to carry and process wild seeds and nuts. They also made a deep-troughed metate with a shelf at one end, called a Utah metate, used to grind corn and wild plant seeds.

The Fremont people had a new weapon—the bow and arrow—which made them more efficient hunters. They could shoot further and with more accuracy than



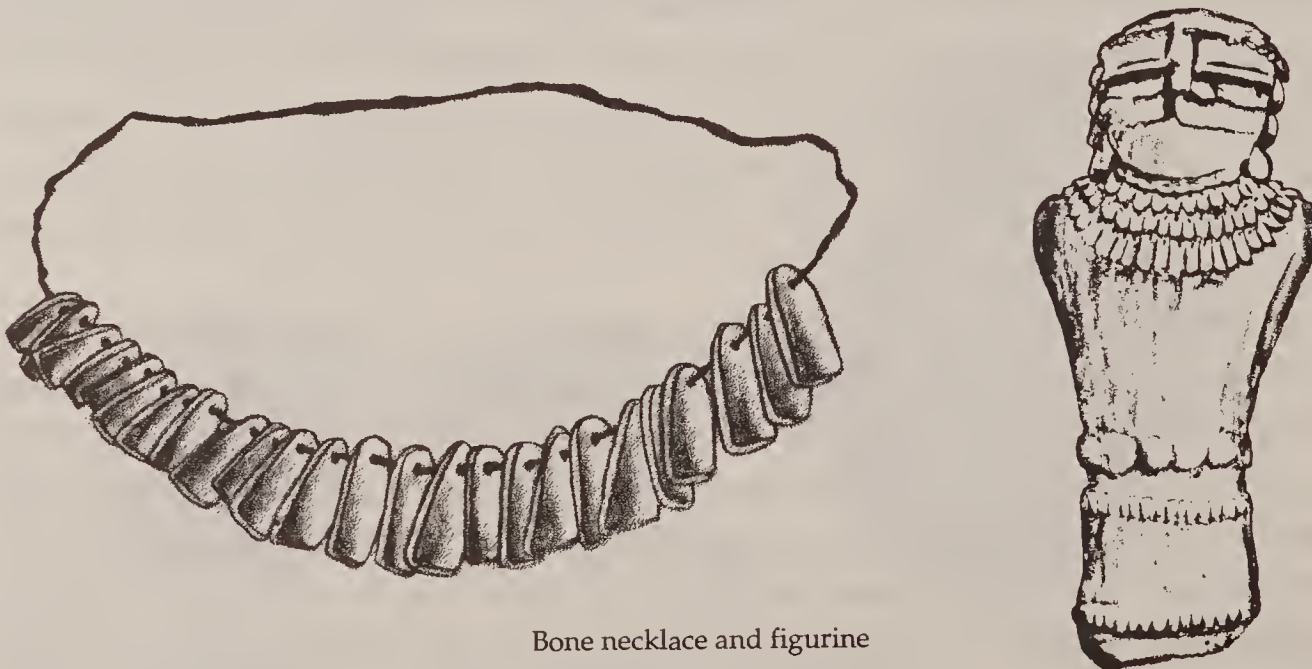
Bow and arrows

with the Archaic atlatl. Their arrows and the stone points were much smaller than atlatl darts. One common type of Fremont arrowhead is the Rose Spring type. These are the first true "arrowheads" in Utah. Archaeologists call stone points "projectile points" and use the word "arrowheads" only for points that were really used on arrows.



Arrow points

The Fremont people made unusual and interesting figurines of clay, decorated with elaborate necklaces and facial markings. The figurines are rather rare and are sometimes found with stored corn. Perhaps the figurines served in some agricultural fertility ritual or had a religious meaning. Some rock art figures, looking very much like the figurines, may also have been made by the Fremont people.



Bone necklace and figurine

Living in villages instead of as nomads changed the lifeways of people. Nomadic people, traveling on foot, had few possessions that they carried with them. They hardly ever used pottery because it was too heavy and fragile to be worth carrying from place to place. They did not build permanent houses that needed care; instead



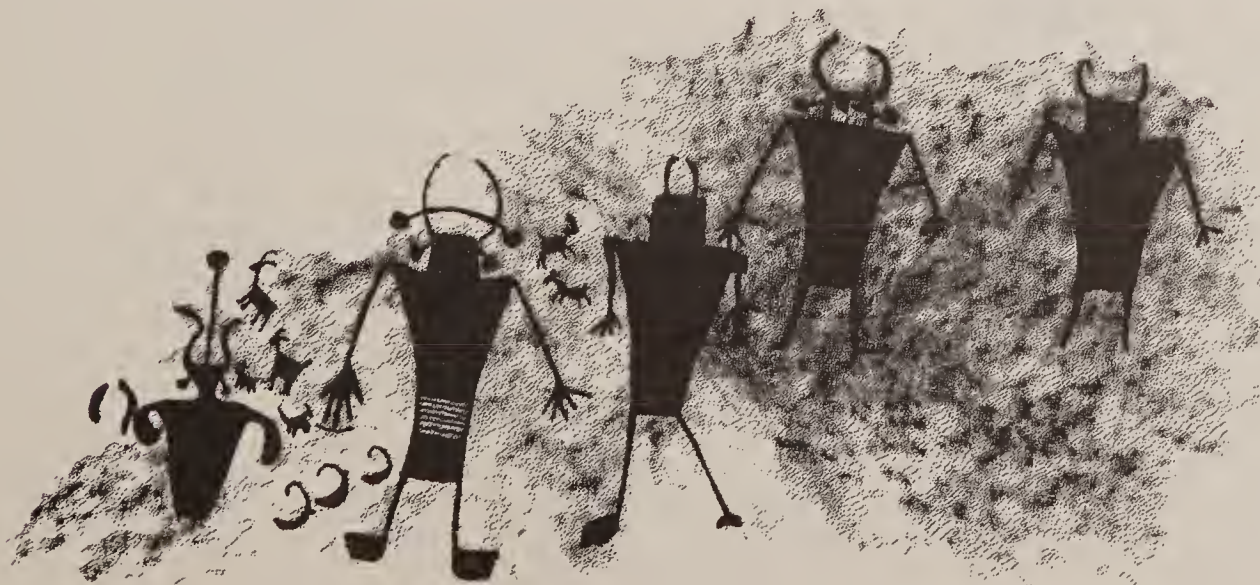
they lived temporarily in caves or small structures made of brush. The hunters and gatherers moved to where the food was and to caches of wild foods they had stored to support themselves for short periods.

Village dwellers typically have many more things than do nomads. Peoples' roles change, too. Some people would have to stay in the village to protect fields and stored food and to maintain the houses. New solutions to disagreements had to be worked out. People couldn't just leave if there was an argument, like nomads could. Villagers also had to develop ways of making decisions about things that affected everybody, such as when to plant the fields or where to build a new pithouse in the village.

Another difference that often occurs between nomads and village dwellers is that some villagers become specialists, skilled at certain crafts or specialties. For example, someone could become an expert flintknapper and exchange arrows with an expert potter for a ceramic bowl. Government, economics, and many other lifeways change when people begin to live together permanently.

A major question anthropologists are trying to answer is why people who have lived fairly well as hunters and gatherers would decide to settle into permanent villages where the work is harder and life more risky. Studies around the world have shown that nomadic people often have more leisure time than do farmers, and also they are better able to cope with disasters and accidents. Imagine a farming community with very low corn supplies because they have had a drought three years in a row. They have very few choices for dealing with this disaster. They can either stay, try to survive the winter and expect some of their people to die of starvation, or they can abandon their homes, fields, and belongings, which they have worked hard to build, and go back to hunting and gathering. This would be especially difficult because they would have lost the experience of living a nomadic life. If nomadic people have trouble getting food, they can move on to a new location. For instance, if pine nuts are not producing in one area, they can move to another area or choose to eat a different food. The study of Fremont people may help to answer this question because some of them lived a nomadic life and other Fremont people led a settled life.

One problem archaeologists have in their study of Fremont sites is that these areas were also very popular with the early farming settlers. The settlers built their



Fremont rock art



villages on top of the older Fremont villages, and then their villages became towns and even cities. Today it would be impossible for archaeologists to excavate a big area, in Richfield for example, because houses, roads, shopping centers, schools, and farm fields cover evidence of earlier people. Every so often construction workers will accidentally dig into a Fremont site, as happened in Richfield in 1976 when the technical school was being built. Archaeologists were able to excavate a small portion of the Fremont village there. They named the site Backhoe Village!

Archaeologists do not find Fremont artifacts more recent than 750 years of age. The fate of the Fremont people is one of the major questions archaeologists are trying to answer. Did the Fremont move from the area due to a widespread drought? Did they leave because the Numic-speakers (who were the ancestors of modern Shoshone, Paiute, and Ute people) moved into the area and forced them out? Or did the Fremont and the new arrivals marry and mix cultures, becoming unrecognizable in the archaeological record? Some Native American people believe that they are the direct descendants of the Fremont people.

People can help archaeologists find answers to these questions by helping to protect archaeological sites. Since the Numic-speaking people lived in Utah more recently than did the Fremont, their artifacts are on or near the surface. In some places, such as caves, Fremont artifacts are buried underneath Numic artifacts. If left undisturbed, these sites could be studied to learn the relationship between the Fremont and the Numic-speaking people. Unfortunately, looters and vandals illegally digging for artifacts have disturbed the top levels of many of the sites where Numic and Fremont remains lie. There are only a few of these sites remaining, so their preservation is very important.

Remember the things you can do to save our past:

1. Enjoy sites without collecting artifacts or digging.
2. Refuse to buy artifacts.
3. Always report anyone you see collecting artifacts or digging sites to law enforcement people.



Third Grader Becomes Archaeological Hero !

The largest Fremont village ever discovered is called Five-Finger Ridge, located south of Richfield and excavated during the construction of Interstate 70. A local third-grader, Steven Magleby, became an archaeological hero and truly saved this site from destruction. His school visited a nearby site, Icicle Bench, which was being excavated by archaeologists before Interstate 70 was built on top of it. Steven told his father about the site they had visited. This information caused Mr. Magleby to remember a site he once visited as a boy. He and Steven went to visit the archaeologists at Icicle Bench and then showed them the larger village Mr. Magleby had seen a long time ago. Archaeologists excavated this site, and it became known as Five-Finger Ridge. If Steven had not had such an interest in archaeology and told his father about their school visit, there would not be a Fremont Indian State Park today, and archaeologists would have lost much unique and valuable information about the Fremont for all time. Sometimes, one person can make a world of difference! (An excellent video entitled "Fremont Indian State Park" about the archaeology of the area is available from the State Park.)





The Fremont People

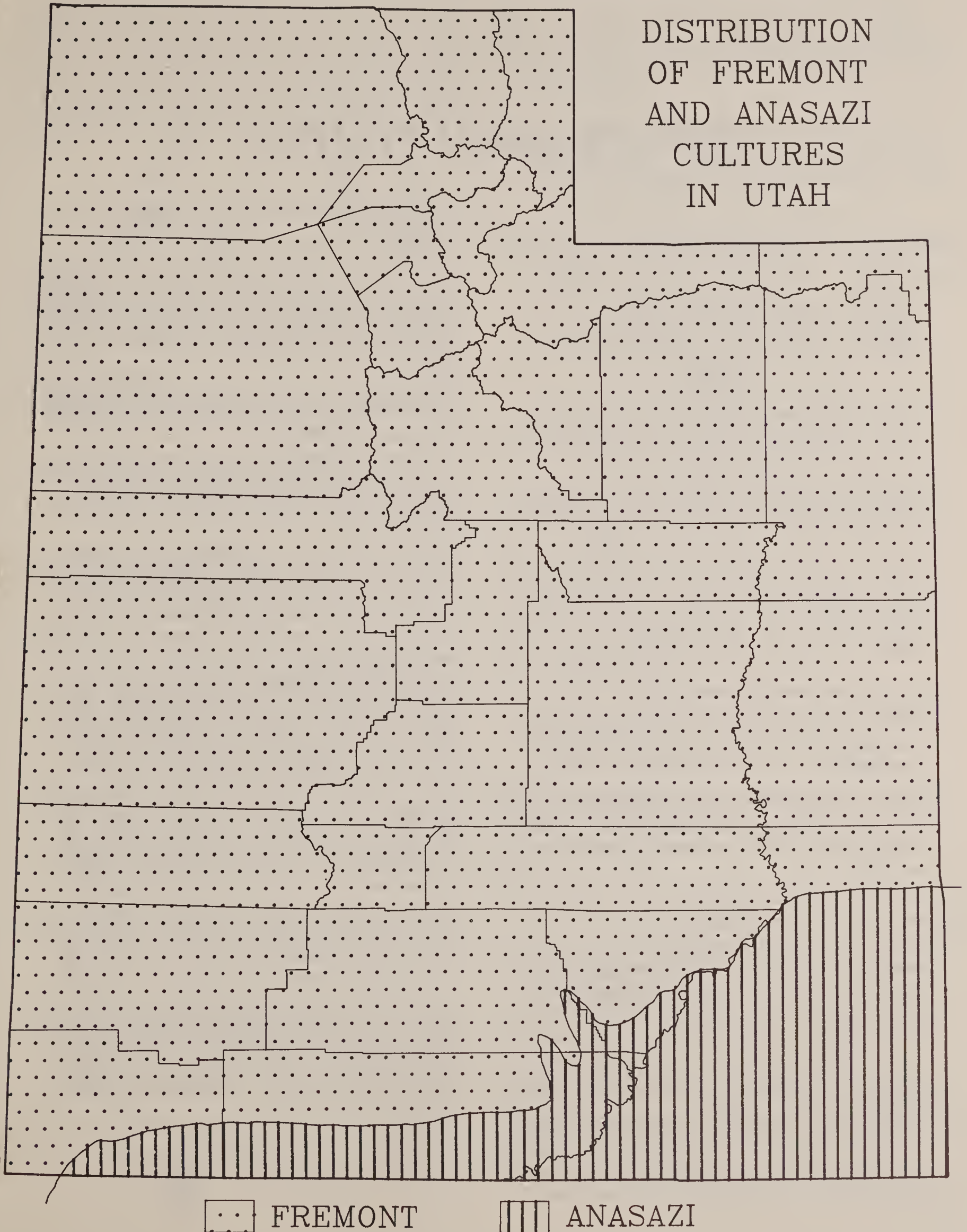
Name: _____

1. Would you rather be a Fremont person who lived in a village, or in a small nomadic group? Why?

2. You are out with your family exploring the West Desert. You come upon a cave and your cousin wants to get some shovels and dig for arrowheads. How would you explain to him or her why this should not be done?

Distribution of Fremont and Anasazi Cultures in Utah Map

DISTRIBUTION
OF FREMONT
AND ANASAZI
CULTURES
IN UTAH





THE ANASAZI PEOPLE

Teacher's Supplement

Vocabulary:

ceramics: vessels made of fired clay.

cultigen: a plant which is dependent on humans to grow and reproduce.

kiva: usually an underground structure, for ceremonial use. First built by the Anasazi people; Hopi and Rio Grande Pueblo people continue to build and use kivas today.

mano: the shaped hand-held stone used to grind grains, nuts, seeds, and mineral pigments by moving it back and forth on a metate.

metate: a shaped stone slab used as a base upon which grains, nuts, seeds, and mineral pigments were ground with a mano.

midden: an area used for trash disposal.

perspective: point of view.

pithouse: a type of structure built partly underground, so that the earth forms all or part of the side walls.

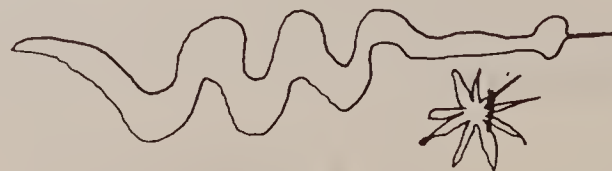
pueblo: Spanish for "town"; applied to a type of Anasazi structure with joined rooms, built above ground, and sometimes more than one story high.

Summary of Key Points:

- The Anasazi people lived in the Four-Corners area from about 2500 to 700 years ago. The Hopi, Zuni, and Rio Grande Pueblo people are their probable descendants. The Anasazi cultural sequence has been defined in time periods, in Utah beginning with Basketmaker II through Basketmaker III, Pueblo I, Pueblo II, and Pueblo III.
- Anasazi sites are spectacular and world famous but are threatened by vandalism, illegal digging, and artifact collecting. Some Native Americans feel they are witnessing the destruction of

their heritage when sites are destroyed and artifacts stolen.

- BM II people made baskets, gray pottery, manos and metates, had dogs and turkeys, lived in pithouses, and grew corn as well as gathering and hunting wild foods. They often buried their dead in caves, where they naturally mummified.
- BM III people lived in larger pithouse villages, grew corn, beans and squash, and made plain and painted pottery.
- P I Anasazi began to live in surface dwellings of joined rooms (pueblos). They built kivas and made a new variety of ceramics, an orange painted ware.
- P II times saw a great expansion of the Anasazi culture area as they became intensive farmers. Great kivas became more common, linked by an extensive road system. The dead were buried in middens. Many varieties of pottery were made and traded widely.
- Anasazi culture peaked during P III times. Large cliff dwellings and tower sites were built. Kivas were decorated with murals. Beautiful pottery continued to be made and traded. The Anasazi wove cotton and made elaborate jewelry.
- By A.D. 1300, the Anasazi had abandoned Utah for unknown reasons. A drought at this time perhaps coincided with over-population, deforestation, and the appearance of the nomadic raiding ancestors of the Navajo and Apache.
- Native Americans and archaeologists agree that archaeological sites must be preserved. However, they sometimes differ in their views when archaeologists excavate sites and especially when they uncover human burials. Archaeologists seek information about the past, and Native Americans claim spiritual rights to have their ancestors' remains undisturbed. There are recent examples of the two groups cooperating on this issue.



Extension:

A wonderful children's book about a young Anasazi boy's life at Mesa Verde is *The Coming of Gray Owl*, by Ida May Hobbs, (1987, Mesa Verde Museum Association, Mesa Verde National Park, CO). A beautifully illustrated children's book about the Anasazi is Stephen Trimble's *The Village of Blue Stone*, (1990, Macmillan Publishing Co., New York, NY).



Link:

Section Three, Lesson 21: "Archaeological and Ethnographic Analogy: The Anasazi and the Hopi"

References:

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Illustration Sources:

- spindle - Jennings, 1978b, p. 372
 sandal - Ortiz, 1979, p. 114
 mano and metate - Powell and Gumerman, 1987, p. 100.



The Anasazi People Activity Sheet Answers

1. **Basketmaker II:** baskets, gray pottery, pithouses, mostly hunters and gatherers, manos, metates, pet dogs, turkeys, mummified dead.

Basketmaker III: pithouse villages, corn, beans, squash, plain and painted pottery, bow and arrow.

Pueblo I: pueblos, kivas, orange pottery, corn, beans, squash.

Pueblo II: masonry pueblos, great kivas, many varieties of pottery, midden burials, corn, beans, squash.

Pueblo III: cliff dwellings, towers, kiva murals, many varieties of pottery, jewelry, cotton cloth, Utah abandoned at the end of this period.

2. **midden:** garbage heap, area for trash disposal.

kiva: underground ceremonial structure still in use by Anasazi descendants.

mano: the handheld stone used with a metate for grinding corn and other grain.

cliff dwelling: the type of Anasazi dwelling built into cliff alcoves or caves, typical of P III times.

pueblo: the type of Anasazi dwelling that has the rooms joined and built above ground; typical of P I and later times.

3. (a) Artifacts excavated by archaeologists are kept in a public museum for viewing or study by the public; looters keep or sell the artifacts.

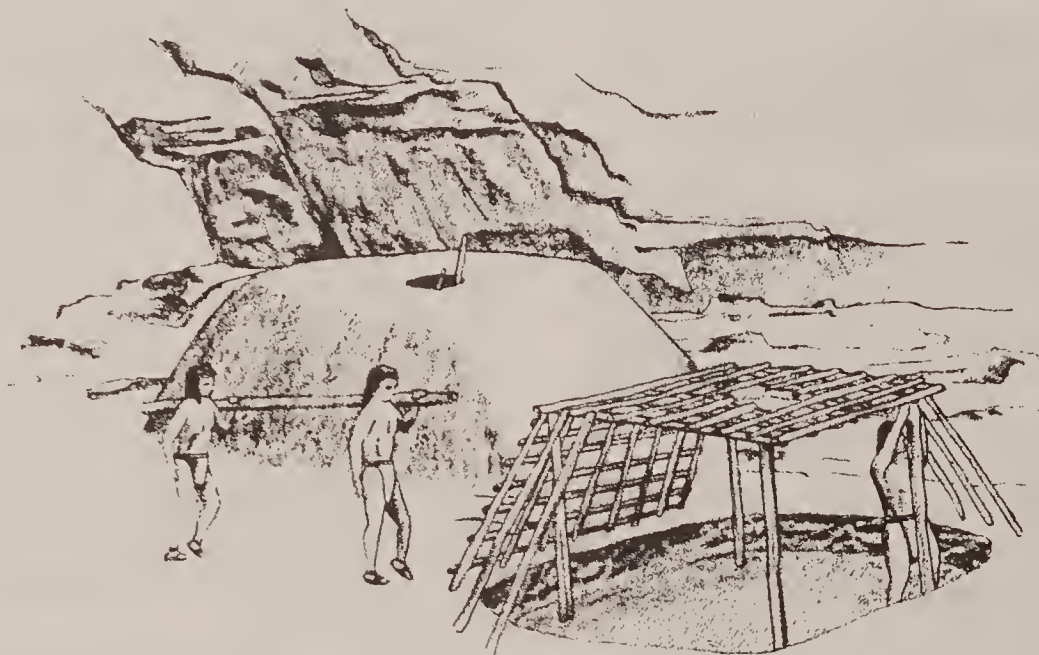
(b) Archaeologists take careful notes and many photographs so they can reconstruct the site from the recorded information; looters simply dig sites to take perfect or whole artifacts to sell, destroying the information contained in a site.

THE ANASAZI PEOPLE

The Anasazi culture began about 2500 years ago and centered in the Four-Corners region. In Utah, the Anasazi generally lived south of the Colorado River and in the southwestern part of the state. The Fremont people were the Anasazi's neighbors. They lived to the north of the Anasazi homeland.

Anasazi sites are often well preserved, and archaeologists have studied the people for more than 100 years, so a lot is known about them. One archaeologist, Alfred Kidder, divided the Anasazi people's culture into time periods—Basketmaker II, Basketmaker III, Pueblo I, Pueblo II and Pueblo III. This division is called the Pecos Classification.

The earliest Anasazi period, Basketmaker II (BM II), lasted from 2500 to 1500 years ago. During this time, people were beginning to grow corn on a part-time basis and to live in small villages of shallow pithouses. Late in BM II times, people began to make plain gray pottery. The people were still mostly hunters and gatherers.



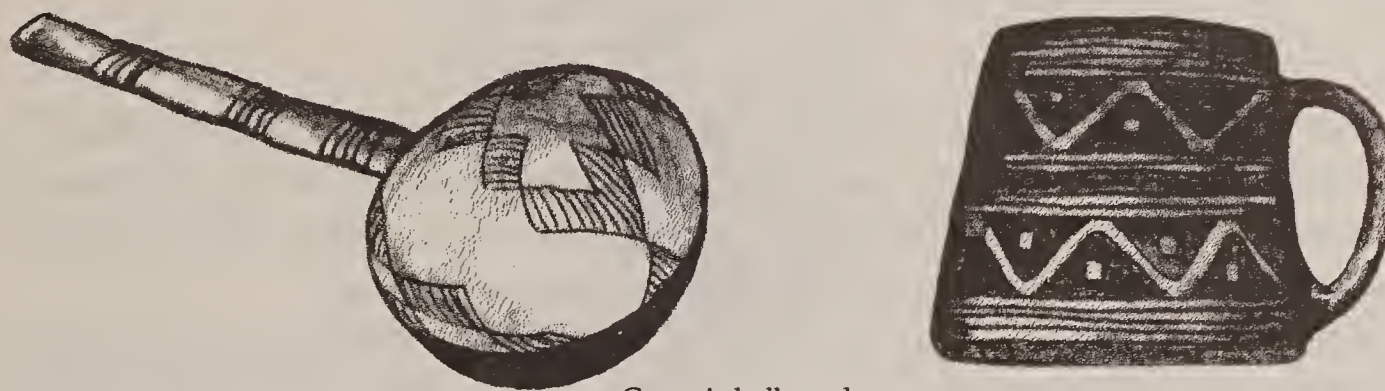
Basketmaker pithouse

BM II Anasazi received their name from the beautiful baskets they made. Some were shaped like trays, and there were also bowls, some round with narrow necks, and covered with a waterproofing pitch from pine. These baskets, and most of the information archaeologists know about BM II people come from cave sites. Dry caves have preserved items that would decay if they were exposed to wind, rain, and sunlight. Artifacts found in BM II caves as well as throughout all of the Anasazi times include carrying bags made of small animal skins and net, sandals, padded cradle boards for carrying babies, fur and feather robes, mats, stone and bear bone necklaces, manos and metates, bone whistles and gaming pieces. Dogs and possibly turkeys were domesticated by this time. BM II people stored food and other items



in small stone and slab-lined pits in the caves. Some of the pits became tombs for the dead and were covered with a pole roof. Since cave sites are so dry, many BM II people buried in them became naturally mummified. The Basketmaker people were often buried with a new basket over their head and unworn sandals on their feet. Mummified small dogs, possibly pets, also have been found buried in caves.

The Basketmaker III (BM III) period lasted from 1500 to 1300 years ago. BM III people lived in small villages of up to about 50 or 60 people. They grew corn, beans, and squash, and often used the squash as gourd water containers. They made both a plain and a black-painted gray pottery. BM III people still used wild plants and animals a lot. Corn and wild seeds and grains were ground into flour using a mano and metate. They hunted with the bow and arrow and made well-crafted stone knives set in wooden handles.



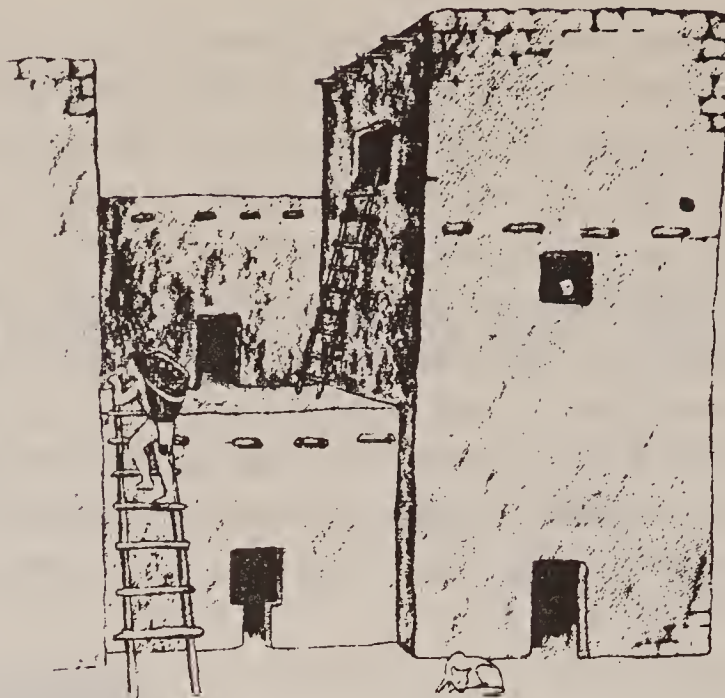
Ceramic ladle and cup

The homes of these people were deep pithouses. Some pithouses were carved into bedrock. This carving was done without the use of metal tools. BM III pithouses were usually round with an attached alcove and a ventilation shaft for bringing in fresh air. Upright stone slabs were placed near the entrance where the fresh air entered the underground home. These slabs helped the air move around the room but not blow across the central hearth.

After about 1300 years ago, the Anasazi began to build their buildings above ground with stone masonry and jacal [HA-call] (poles and mud). The rooms were joined together but were still only one-story high. These apartment house dwellings are called pueblos, a Spanish word for village, from which this Anasazi period gets its name: Pueblo I (P I). Kivas, underground ceremonial structures, were first built during this time. Archaeologists think the kivas were used for ceremonies and rituals because they are similar to the kivas of today's Pueblo and Hopi Indians. The Pueblo I Anasazi people in the Blanding, Utah, region made an unusual and very attractive orange pottery, some of it painted with red and black designs.

Pueblo II (P II) times lasted from 1100 to 900 years ago. It was during this time that the territory of the Anasazi grew. This may be related to a warmer and wetter climate at the time. More people may have lived in southeastern Utah during Pueblo II times than live there today. A lot of the Anasazi's food now came from farming although they still collected some wild foods. Southern Utah was a dry land, so raising crops for food was a challenge. The Anasazi had to create ways to get water to their crops. One way they did this was to build reservoirs to save water.

During Pueblo II times, people lived in small, scattered farming villages or in larger communities. They lived in above-ground rooms connected together. Many



Pueblo dwelling

of their kivas were small and circular, but very large kivas were also being built. It is believed that these "great kivas" served as gathering places for large numbers of people. Recently, an extensive prehistoric road system has been discovered in southeastern Utah which appears to have connected great kivas.

Ceramics of the Pueblo II times are of many shapes with beautiful painted patterns done mostly in black and white. People living in different regions of the land made differing styles of pottery. Archaeologists know that they traded pottery with each other because pottery from one region has been discovered in other regions far away.



Ceramic jar

The Anasazi buried their dead in middens, or garbage heaps. Perhaps the following, written by a Pueblo Indian woman, explains the belief behind this practice: "Corn cobs and husks, the rinds and stalks and animal bones were not regarded by the ancient people as filth or garbage. The remains were merely resting at a midpoint in their journey back to dust. Human remains are not so different. They should rest with the bones and rinds where they all may benefit living creatures—small rodents and insects—until their return is completed. The remains of things—animals and plants, the clay and the stones—were treated with respect. Because for the ancient people all these things had spirit and being. The dead become dust; and in this becoming, they are once more joined with the Mother. The ancient Pueblo people called the earth the Mother Creator of all things in the world" (Silko, 1987, pp. 83-84).

The Pueblo III period was the high point of the Anasazi culture. By the end of this period, the Anasazi would be gone from Utah. At the beginning of the Pueblo III

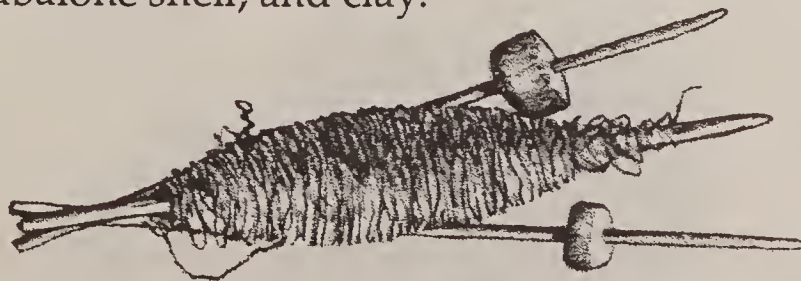
period, 900 years ago, the people began forming larger communities. Many of them left their small, scattered, farming villages and built large villages of many-storied apartment buildings, often in cliff alcoves. The well-known and spectacular cliff dwellings of Mesa Verde were built at this time, as were the mysterious towers at Hovenweep National Monument. The purpose of these towers is not known. Small chips of painted plaster on the outside of cliff-dwelling walls and beautiful painted kiva murals demonstrate the Anasazi's interest in decoration. It was hard work building the cliff dwellings. Each rock was hauled into the alcove, and chipped into shape. All their resources, including water, had to be carried to the dwellings. It is still a mystery why the Anasazi left their smaller villages and spent so much time and energy in building the cliff dwelling communities in which they lived for only 125 years.



Cliff dwelling

The cliff-dwelling communities were often designed and built as units rather than the room-by-room additions of the earlier villages. These sites had several small kivas probably belonging to different clans. Planning, building, and living together in large settlements meant that the Anasazi of this time had to be able to make decisions with which the whole community would agree. Archaeologists also see evidence of trade as well as evidence that some members of the community had certain jobs such as making ceramic pots, and special roles such as spiritual leader.

The Anasazi continued to make beautiful pottery. They also grew and wove cotton into sashes and loose-fitting shirts. Jewelry was made of turquoise, lignite (a black stone), bone, abalone shell, and clay.



Spindle with cotton yarn



A woman using a mano and metate

The Anasazi seem to have moved out of Utah about 700 years ago. People may have moved south and east to the large pueblos of the Rio Grande River area, to Zuni, and to the Hopi mesas. There are many ideas about why the Anasazi abandoned the Four-Corners region. A 26-year long drought in the last part of the thirteenth century may have made farming too difficult. There had been similar severe droughts in earlier times, but no one left. The drought was probably one of many reasons the Anasazi moved out of the region. There is some evidence that some areas were deforested by the Anasazi, which may have been another reason for their leaving. People living in large villages use enormous amounts of wood as building material and as fuel for heating and cooking. The weather patterns were also changing at this time from winter rains to heavy late summer thunderstorms. The rain and the deforested landscape caused arroyo cutting and erosion of the land, making farming even more difficult. There may also have been simply too many people, and the land was not able to support large numbers of people. At the same time these events were taking place, the Navajo and Apache people began to move into the area. These people were nomadic, and problems may have occurred between them and the Anasazi. In fact, "Anasazi" is a Navajo word meaning Ancient Enemy, sometimes translated as Ancient Ones.



Anasazi rock art

Anasazi artifacts are some of the most wondrous and beautiful in the ancient world and have long been sought after by museums and collectors. Today there is an illegal

market for these artifacts, especially pottery, which can bring very high prices. Looters and collectors look at artifacts as beautiful and valuable things. Archaeologists look at artifacts as messengers of the past people who made them. They do not keep the artifacts they study, but instead give them to public museums for other people to see, or to be saved for future research. In this way, the artifacts belong to everyone. Because taking artifacts from public lands is illegal, looters and collectors often keep the artifacts for themselves or sell them illegally, making them unavailable for study or for other people to enjoy.

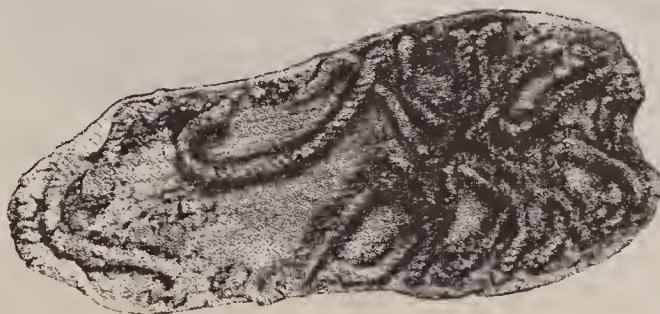


Corrugated pottery

Anasazi ruins have been plundered for over a century. There are not many ruins left that have complete and undisturbed archaeological deposits. The modern-day Pueblo Indians of the Rio Grande drainage area and the Zuni and Hopi Indians are probably living links to the Anasazi and still keep many of the traditions of the ancient people. Some of these people feel that their heritage is being stolen and destroyed when people illegally dig in sites. They, and many other American Indian people, feel that the spirits of their ancestors are still part of prehistoric sites. It feels very wrong to them to see sites dug up.

Ancient archaeological sites are the cultural heritage of all Utahns and all Americans. Euro-American settlers were late arrivals in Utah and cannot claim descent from Native Americans; but when graves are desecrated and sites destroyed everyone loses. It is the heritage of the land that we all call home.

Looters are usually looking for pottery; and since Anasazi people often buried pots with their dead, looters and vandals dig up many human burials in their quest for pots. They scatter the bones all around and sometimes even take the skulls. All cultures have beliefs about the proper treatment of the dead and feel a great sense of wrong when these beliefs are violated. Indian people feel very shocked and upset when the graves of their ancestors are disturbed. Likewise, non-Indian Americans would be angry and deeply hurt if people went into cemeteries and dug up the bones of their dead relatives, stealing their gold teeth and other grave goods.

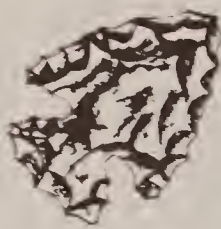


Sandal



Archaeologists and American Indians agree that sites must be protected, but they have different reasons for their beliefs. Archaeologists know that science is constantly developing new ways to help learn about the past. Sites need to be protected well into the future if archaeologists are to learn as much as possible about past people. Also, professional excavation is very expensive and time-consuming, so excavations are not often done today. Archaeologists want to see sites preserved as data banks, like untapped libraries about past people. Indian people want to see sites left undisturbed because they are places of their ancestors. They feel there is a spirit to these places that should not be disturbed. Human burials, especially, should be left in peace. Indian people can feel a great spiritual disharmony when they see sites excavated and human burials disturbed.

Archaeologists and Indian people can work together against vandalism, but there have been disagreements between the two groups about archaeological excavation. Archaeologists destroy sites in the process of excavating them; but they keep detailed notes, maps, drawings, and photos so that the site is saved on paper. They are uncovering the past and are able to be a source of certain kinds of information to American Indians about their ancestors. Still, in some Indians' view, archaeologists disturb the spirit of these places, and occasionally they will uncover a human burial.



Arrow point

Archaeologists have many scientific methods available to them for studying human bones. From bones, they can learn a person's sex and age at the time of death. Certain diseases leave markings on bones, so sometimes they can learn the cause of death. The tests can also tell about the nutritional health and diet of the ancient person. A new technique for removing DNA from bones will allow archaeologists to trace the degree of genetic relationship between people. This technique requires that a small piece of bone be destroyed in the process. Often Indians express their dislike for the study of their ancestors' bones. Citizens are sometimes in the position of deciding if the spiritual rights of descendants is more important than the scientific study of past cultures. Who owns the past?



Ceramic bowl



Recently, there have been examples of archaeologists and Indian people working together on this issue. Some Indian tribes have given archaeologists permission to do bone studies as long as the bones are later returned to the tribe for reburial with proper rituals. In some cases, Indian tribes have asked archaeologists to remove a burial that has been disturbed by some natural cause, like erosion, or has accidentally been uncovered.

Utah has had problems in protecting ancient sites. Unless we act now to save the ancient piece of our American past, there may not be anything left to save. Wholesale quantities of pottery, skeletal remains, petroglyphs and pictographs (carvings and drawings on rock made by ancient peoples) as well as other valuable clues to our past have been damaged or removed. Remember, never dig at archaeological sites or collect artifacts. Discourage others from digging sites by refusing to buy artifacts from them. Immediately report anybody you see digging or collecting artifacts to law enforcement authorities. There is not much time left, but with everyone working together, we can save Utah's past. Remember, it only takes one person ten minutes with a shovel to destroy hundreds of years of prehistory.

*** If you enjoyed this description of the Anasazi, you may want to read three stories set in Anasazi times:

1. *The Coming of Gray Owl* by Ida May Hobbs (1987);
2. *The Village of Blue Stone* by Stephen Trimble (1990); and
3. *The Pueblo* by David and Charlotte Yue (1986).



The Anasazi People

Name: _____

1. List one thing which describes each time period of the Anasazi. Types of houses, food, way of life, or typical artifacts are possibilities to list.

Basketmaker II:

Basketmaker III:

Pueblo I:

Pueblo II:

Pueblo III:

2. Give a short definition of the following words:

midden:

kiva:

mano:

cliff dwelling:

pueblo:

3. Name one difference between an archaeologist excavating a site and a looter digging to collect artifacts.
-



THE NUMIC AND NAVAJO PEOPLE

Teacher's Supplement

Vocabulary:

dialect: a regional variety of a language.

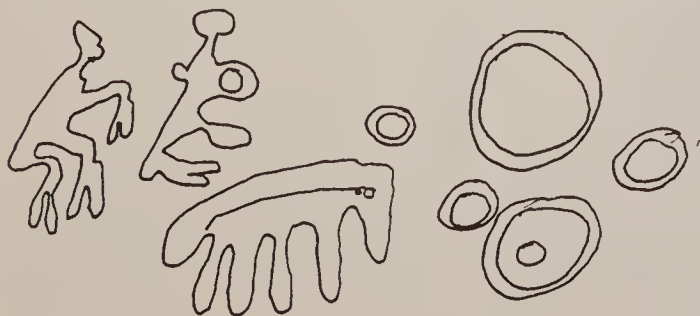
hogan: the type of home built by Navajo people, usually round and built of logs with mud mortar.

Numic: The term applied to Indian people who historically spoke a derivative of the Numic language. Modern-day Northern Paiute, Southern Paiute, Goshute, Ute, and Shoshone people are descendants of Numic speakers.

wickiup: a small temporary structure constructed of brush and poles often conical in shape.

Summary of Key Points:

- The Native peoples encountered by Utah settlers were the Numic-speaking Ute, Paiute, Goshute, and Shoshone people, and the Athabaskan-speaking Navajo people.
- Numic people first appear in Utah about 500 years ago and may have displaced the Fremont people. Numic people lived a nomadic hunting and gathering lifestyle.
- Navajo people arrived in Utah some time after 500 years ago and became herdsman.
- Utah Indian people acquired the horse about A.D. 1650, with far-reaching consequences. Housing, trade, inter-tribal warfare, and hunting are some aspects of culture that changed.
- Hostilities between Indian people and white settlers reached a peak between 1860 and 1870, after which Indian reservations were established.



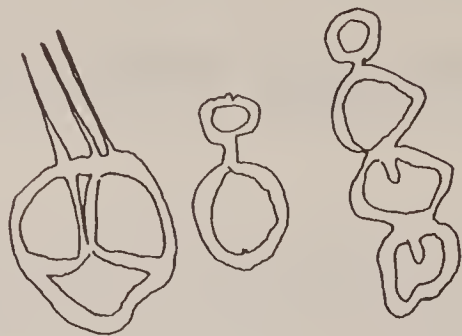
- Today there are seven Indian tribes in Utah—Confederate Tribes of Goshute at Ibapah, Skull Valley Band of Goshute, Northwest Band of Shoshone, Uinta and Ouray Ute, White Mesa Ute, Southern Paiute and Navajo.
- Utah Indian people embody a long and rich heritage, some of which is represented in the archaeological record.



Extensions:

- Invite an American Indian to speak to the class. Contact local tribal offices, the talent bank for ethnic minority folk artists maintained by the Utah State Office of Education (538-7695), or Educational Equity Section, Utah State Office of Education (538-7640).
- Many children's books have been written about Indian people, and some use Indian stories. This lesson could be enriched by reading these stories to the class, or by recommending them to the students. The Utah State Board of Education, Indian Advisory Committee, has published *American Indians of Utah: A Guide for Teachers*, an annotated guide to educational materials.
- Published stories from Utah Indian tribes include:
 - Grandfather's Story of Navajo Monsters* (Richard Red Hawk, 1988, Sierra Oaks Publishing Company, Sacramento, CA.);
 - The Way It Was Told* (Uintah-Ouray Ute Tribe, 1977, University of Utah, Salt Lake City, UT);
 - Why the North Star Stands Still* (Paiute stories by William R. Palmer, 1973, Zion Natural History Association, Springdale, UT); and
 - Neuwe Natekwinnappah: Shoshoni Stories and Dictionary* (Wick R. Miller, 1972, Anthropological Papers No. 94, University of Utah, Salt Lake City, UT).

- Share masters of "Approximate Boundaries of Indian Cultures, 1840" and "Utah Indian Reservations and Tribal Lands, 1981." Discuss the changes in boundaries over time and the implications these changes might have on Native Americans.



Link:

Section Three, Lesson 22: "Experimental Archaeology: Making Cordage"

References:

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Shimkin, Demitri B., 1986, "Introduction of the Horse." In *Great Basin*, edited by Warren L. D'Azevedo, pp.517-534. Handbook of North American Indians, vol. 11, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

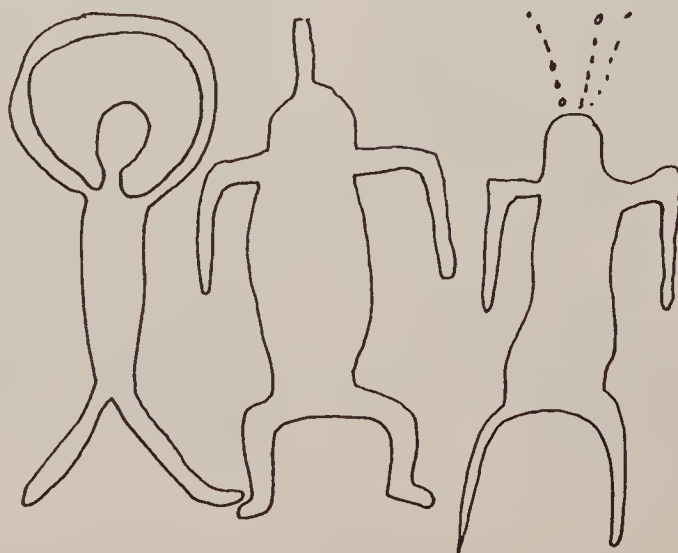
Illustration Sources:

baskets - D'Azevedo, 1986, p.372
Navajo rug - D'Azevedo, 1986, p.594
wickiup - Jennings, 1978b, p. 160.

The Numic and Navajo People Activity Sheet Answers

- houses—tepees are now possible to transport; contact with other groups easier; trade with other groups is easier; warfare between groups increases because of competition for grazing lands; hunting becomes more efficient.
- hogan 2
wickiup 1
tepee 1
winnowing tray 1
wild seeds 1
sheep 2
Desert side-notched arrowpoints 1
- Numic people lived in wickiups (they did not live in tepees until after they had the horse). They lived on wild foods, particularly seeds and pine nuts. They are noted for their fine and varied basketry and a brown or gray-ware pottery. They hunted using bows and arrows and small arrowpoints. Some Numic people grew food on a part-time basis.

Navajo people lived in hogans. They grew corn and other foods, raised sheep, and used them for food and for wool. Wool was woven into beautiful rugs. Navajo people made pottery and also hunted with the bow and arrow.





THE NUMIC AND NAVAJO PEOPLE

Numic Speaking People

The living descendants of the Numic speakers today include the Northern Paiute, Southern Paiute, Goshute, Ute, and Shoshone people. At the time of the first contact with Euro-Americans they lived from the Rocky Mountains to the Sierra Mountains in northern California and from central Idaho south to the Colorado River. The Numic language has several dialects, and people of one tribe could often understand other Numic dialects.

The Numic people are thought to have arrived in Utah about 700 years ago. They came from the Death Valley area of California into the Great Basin. The Fremont people lived in Utah from 1600 years ago to 700 years ago. Their culture appears to have died out at about the same time as the arrival of the Numic people. Archaeologists have three hypotheses to explain the disappearance of the Fremont: (1) the Fremont and the Numic people married each other and became one culture; (2) the Numic successfully competed with the Fremont for the same resources, causing the Fremont to leave the area or die out; or (3) the Fremont left Utah for reasons unrelated to the Numic people. Some modern Numic people think that the Fremont were their direct ancestors.

Numic people lived a lifestyle much like that of the Desert Culture people who lived in Utah before the Anasazi and Fremont people. They were hunters and gatherers who depended on wild plants and animals. Many Numic sites are found near freshwater lakes and rivers. They ate fish and other marsh life, including waterfowl and marsh plants. They also gathered seeds and hunted game animals such as deer, bison, elk, mountain sheep, antelope, rabbits, and other small mammals. Insects (Mormon crickets, grasshoppers) were gathered and eaten. Numic people hunted with the bow and arrow and made arrow points called Desert side-notched. Some Shoshone groups and the Goshute of Deep Creek in western Utah were known in historic times to have planted seeds from wild plants, but they were not full-time farmers.



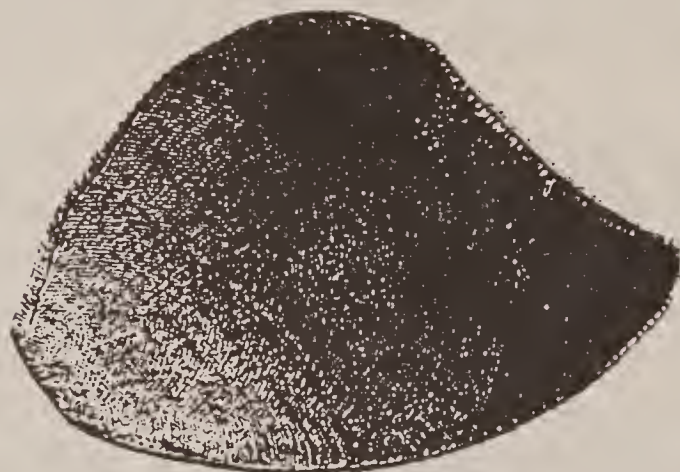
Desert side-notched arrow point

In the arid West, edible plants and animals are seldom abundant in one place, and so the Numic people lived a nomadic way of life. They were experts at finding plants and animals in many locations and during all seasons. During the winter,



several families would gather and form a winter village, often in mountain foothills or river valleys. They lived mostly on foods they had gathered and stored, and many times they did not have enough food to last all winter. Winter was especially hard on the elderly and the very young.

From spring through fall, the Numic people would travel in small family bands, fishing and gathering the first green plants. In the summer, different family bands would get together to have fun and to exchange information about the best places to find wild foods. During the summer, they would store seeds and dry meat for the coming winter. During the late fall, several family bands would gather to harvest the ripe pine nuts. Even today, pine nut gathering by Numic descendants is a time of festivity and tradition. Family groups take outings to harvest the delicious and nutritious pine nuts, some of which they sell.



Winnowing tray



Water bottle basket

Numic people were skilled basketmakers. They made winnowing trays, loosely woven fan-shaped trays for parching and winnowing wild seeds and nuts. They also made large carrying baskets for collecting wild foods, cradleboards for carrying babies, and water jugs. The Numic also made a coarse brown or gray pottery.

The Numic people traveled from place to place on foot until they acquired horses. Their first horses came from the Spanish. Juan de Oñate, a Spanish official, came to Mexico in 1597. He imported hundreds of horses and made Pueblo Indian people slave herdsmen. Indian people were able to get horses when these slaves escaped, and also by capturing horses from the Spanish. By 1650, Ute people were using horses as pack animals but were not riding them. By 1830, most Utah Numic people had horses, except for the Goshute and Southern Paiute.



Pottery



Wickiup

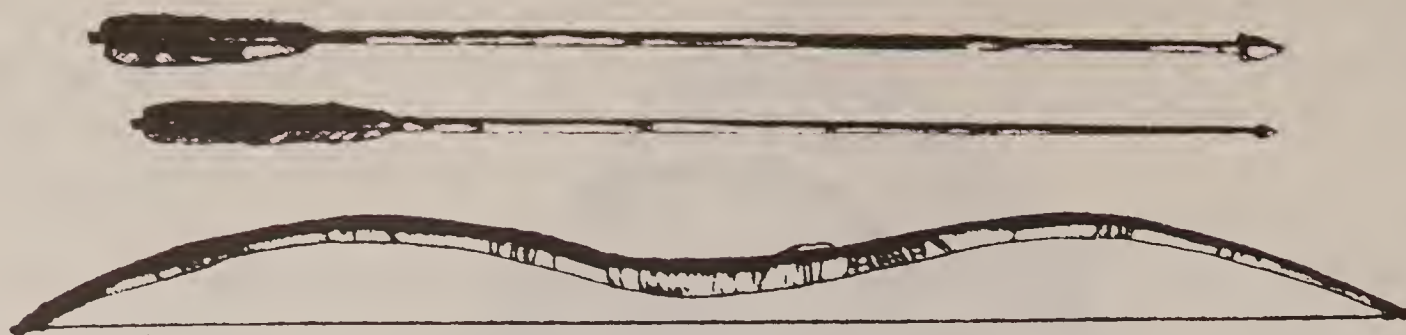
The horse changed the way of life of the Indian people. They became much more mobile and much more efficient at hunting large game, especially bison. Trade and contact with people who lived far away became easier. Indian people began to go to war with each other to get more horses and more grazing land. Having the horse also changed the kind of houses the Numic people lived in. Before the horse, they lived in small brush shelters called wickiups (wick-E-ups). Their new houses were made of hides and poles and called tepees. Having horses allowed them to move these houses easily with them. Relations between Indian groups also changed. The Indians with horses began to attack the Goshute and Southern Paiute, who did not have horses, and would take them as slaves.

The Numic saw very little of the Euro-Americans from about 1776 to 1840. After about 1840, though, more and more people began to come into the Indian homelands, causing many changes to their lifeways. Settlers moving west passed through Utah, bringing herds of cattle, oxen, and horses. These herds severely decreased the amount of seeds, which the Numic people depended on for food. Mormon settlers also began to establish their communities, using land that had been used by the Indians. Diseases which Euro-Americans had been exposed to for a long time were new to Indian groups, and they had no immunity to help them resist these new diseases. Smallpox, influenza and measles caused many thousands of native people to die.

Navajo

The history of the Navajo people in Utah probably begins about 500 years ago. By the early 1600s, the Spanish were calling the Navajo people "Apaches de Nabajo." The Navajo and the Apache are closely related to each other and each speaks a variety of the Athabascan language. It is thought that the Navajo people arrived in the Southwest from the north, but the exact route is not known.

The Navajo interacted with the Pueblo Indians in New Mexico and Arizona. The Pueblo people taught them pottery-making and weaving. The Navajo were farmers of maize and other plants and also hunted with bows and arrows. The Navajo people



Bow and arrows

live in hogans, which are built to symbolize a spiritual connection with the earth. The hogan door, for instance, always faces east to meet the rising sun. Even though many Navajo live in modern homes today, they build hogans nearby for ceremonial use. Hogans have been built in different ways, but the most common is a round shape built of wooden beams with mortar between the beams.

By the end of the 1700s the Navajo began to herd sheep, which they had gotten from the Spanish. When they were forced to leave their land and live on reservations, the Navajo began to use the sheeps' wool to weave beautiful rugs, for which they are famous today. The Navajo Nation is the largest tribe in the United States, with more than 210,000 members. Most of the Navajo Nation is in northeastern Arizona, but it also includes southeastern Utah.



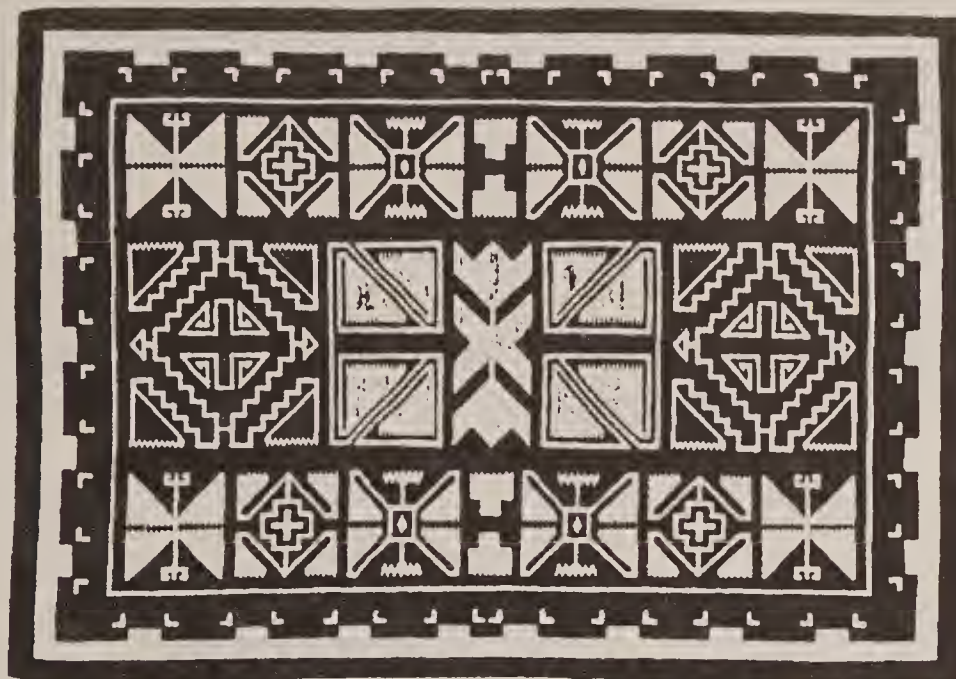
Navajo hogan

Recent History

Between 1860 and 1870, relations between the native Indian people and white settlers became worse, causing wars, raids, and massacres. The U.S. Army began forcing the Indian people onto reservations (see map), beginning with the Uinta reservation in 1885 (today called the Uinta and Ouray Ute Reservation). In addition to the Ute Reservation, Utah Indian reservations include that of the Skull Valley Goshute, scattered holdings of the Southern Paiute, the Navajo Nation, the Northwest Band of Shoshone, and the Confederate Tribes of Goshute Reservations. The White Mesa Ute are a recognized tribe in Utah, but they hold no reservation lands.

The arrival of Euro-American settlers radically changed the Indians' way of life. About 125 years have passed since the Indian people were forced to move onto

reservations and adopt the settlers' way of life. In spite of these difficulties some Native Americans have kept their beliefs, religion, artistic expression, language, child-rearing practices, kinship system, and world view. It is an honor to the spirit of the Indian people that their cultural identity survived through the death of up to half of their population from disease and warfare and the changes to their traditional lifeways. Today, Utah's citizens are fortunate to have within the state the rich and long heritage of Indian people. The opportunity to understand other cultures, cultures with deep connections to the very land we now live upon, is close at hand.



Navajo rug

**Numic and Navajo People****Name:** _____

1. Imagine that you are a Ute boy or girl, and it is 1800. Your family group has just traded for your first horses. Name three things about your lifestyle that change.

2. Place a "1" beside the things that Numic people are known for and a "2" beside the things that Navajo people are known for.

hogan ____

wickiup ____

tepee ____

winnowing tray ____

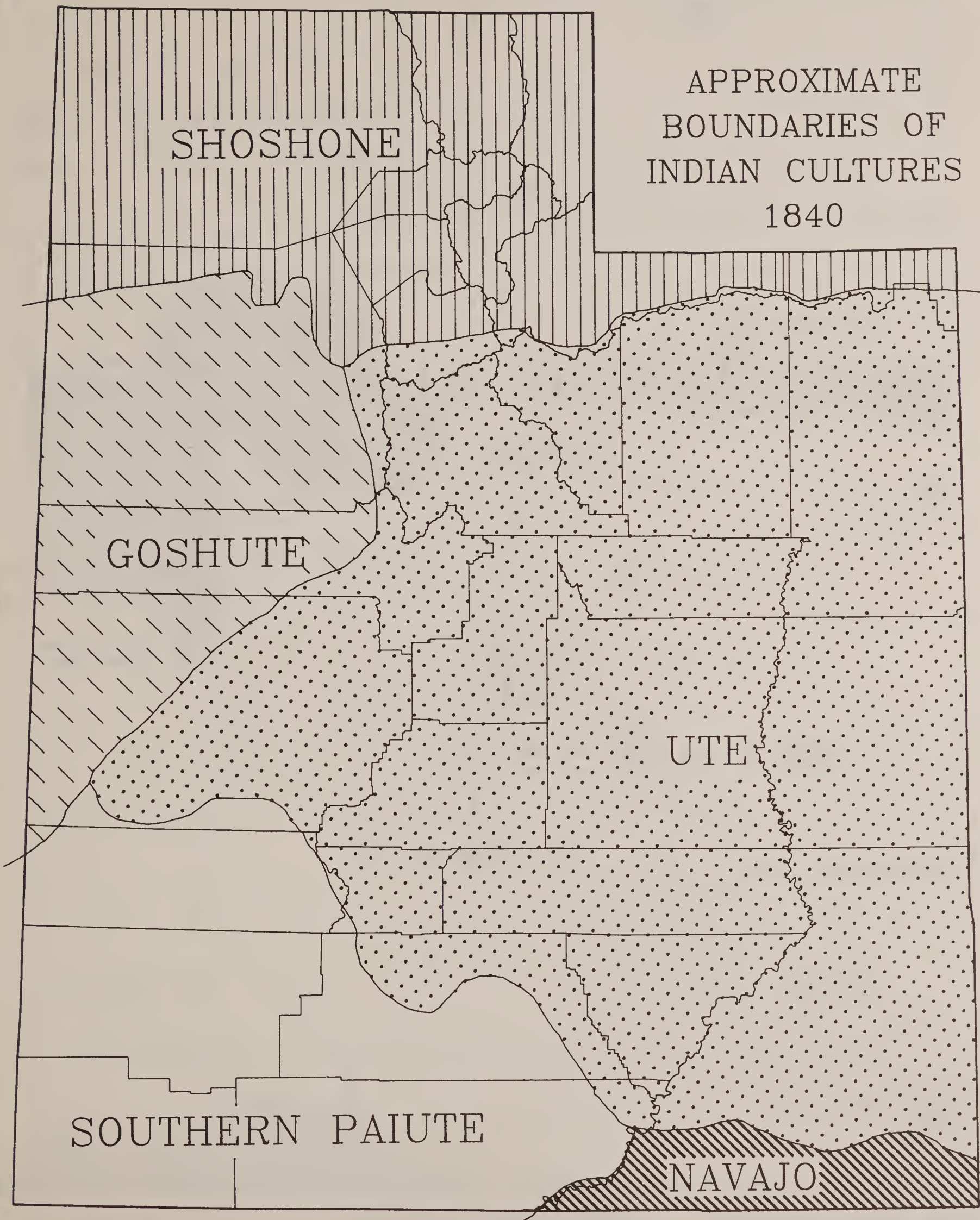
wild seeds ____

sheep ____

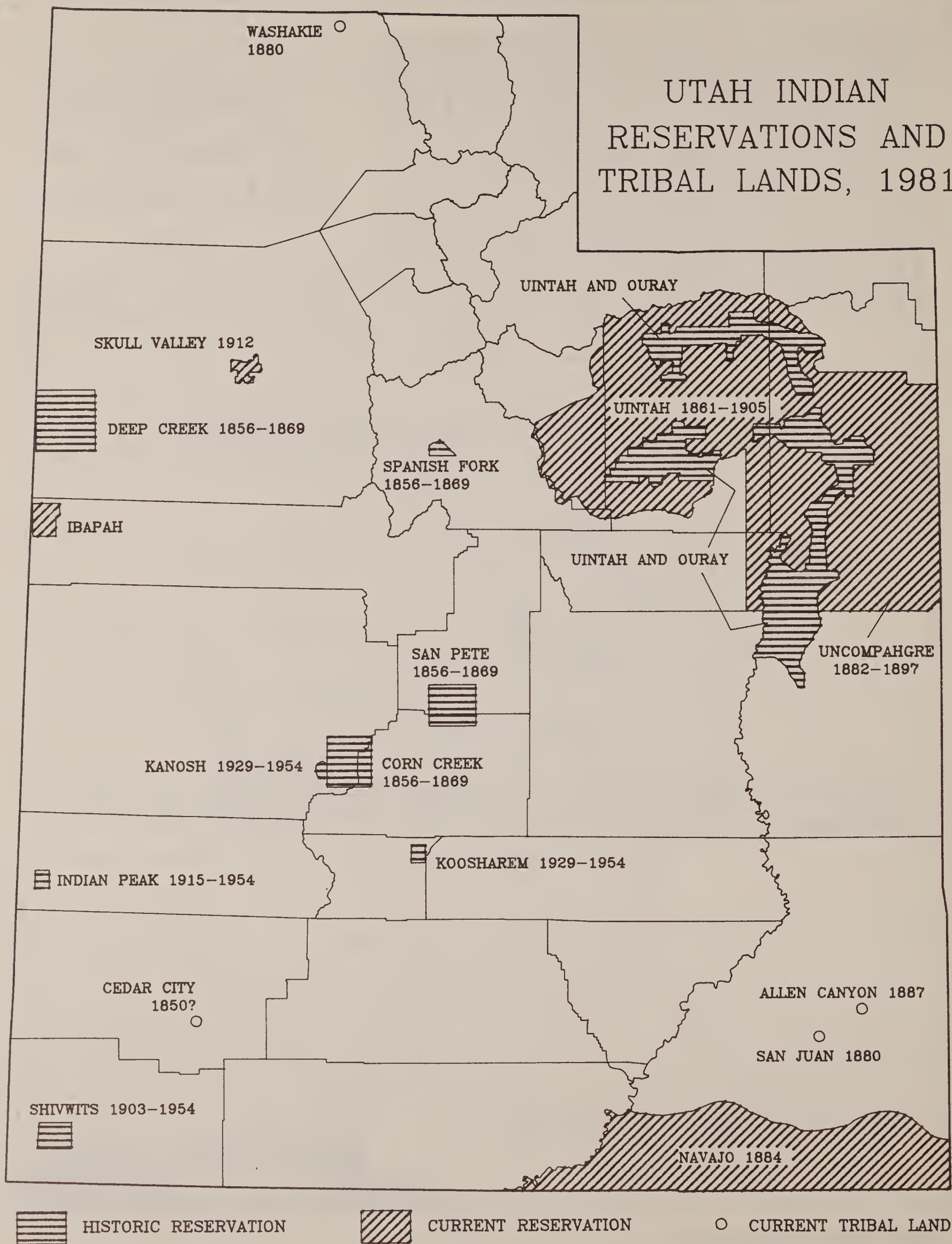
Desert side-notched arrowpoints ____

3. Write a short description of your daily life as if you were a Navajo or a Numic person 400 years ago. Describe your food, your house, and some of the tools you would use.

Approximate Boundaries of Indian Cultures, 1840 Map

APPROXIMATE
BOUNDARIES OF
INDIAN CULTURES
1840

Utah Indian Reservations and Tribal Lands, 1981



Source: Atlas of Utah, 1981

SECTION THREE

THE PROCESS OF ARCHAEOLOGY





INTRODUCTION

What follows is a brief overview of how archaeologists find and excavate a site and analyze the data. This can be presented to students as background content. The lessons in Section Three illustrate many of the processes and concepts presented in this overview. Also included is a summary of dating methods for archaeological materials. Dating is a laboratory procedure and most methods are quite technical. Lessons on tree-ring dating and cross-dating are included in Section Three, but the other methods are summarized here.



Finding Sites:

There are two main reasons why archaeologists look for and sometimes excavate sites. First, they may have a research question about the past that makes it necessary to search a certain area for sites, or to excavate a site. Secondly, sites may be endangered by a development project or natural causes, such as erosion, that requires data to be salvaged before the site is destroyed.

State and federal laws require that land use decisions take into account, among other things, the effect of a project on archaeological and historic sites (cultural resources). These laws apply to all federal and state-managed lands, including those administered by the Bureau of Land Management, National Park Service, Forest Service, the military, and the U.S. Fish and Wildlife Service, and to projects on private land that use federal or state funds or that involve issuing a permit of some kind. Any project that could change land ownership or disturb the surface of the land requires consideration of cultural resources. Typically, the company or agency proposing the project pays for the archaeological work.

Only a small fraction of the state, less than 10 percent, has been systematically explored for cultural resources. Therefore, the first step an archaeologist

takes is to review the records to see if an area has been examined, and if any sites were recorded there. The Utah Division of State History in Salt Lake City keeps the records. Archaeologists working in Utah send their reports and information about recorded sites to them. At this time, interested parties, including Indian tribes, may also be contacted to see if they have concerns or areas of importance within the project area.

If an area has not yet been explored, archaeologists conduct a **survey**, a systematic examination of the land. Since they are trying to find all of the sites present in a project area, they walk about 40 feet from each other in straight lines, back and forth, until all the land has been examined. A compass helps surveyors keep their lines straight. For projects that are linear, such as a railroad or fence, archaeologists walk the strip of land the project will disturb.

Archaeologists are looking for anything that is not natural to the area. They are alert to things like a row of rocks (possibly the remnant of a wall), depressions or mounds (buried structures), chips of stone (debris from stone tool manufacture), dark soil (possible middens, hearths, or burned structures), and pottery sherds. Information about where sites *aren't* is also very important in learning about past people.

In the arid West many sites are still visible on the ground surface. Some sites are buried, though, and archaeologists check animal burrows and arroyo walls for evidence. In densely vegetated areas, archaeologists will sometimes dig a small hole every 50 feet or so, looking for buried sites.

When a site is discovered, archaeologists record data about it on a site form. In Utah, the IMACS form is used; IMACS stands for Intermountain Antiquities Computer System. Information about the vegetation, soil, elevation, and location is recorded, as well as a description of the site, artifacts and structures present. Photos are taken and a map is made. The site is also evaluated for its information potential, and a determination is made about whether or not the site has buried deposits. This recording process is used for both prehistoric and historic sites.

Excavating a Site

If the survey was performed because of a development project proposal, archaeologists will recommend to the agency decision-maker what should be done about the cultural resources. Some sites have limited information potential, and only in-depth recording is done with them. It will be recommended that sites containing important data or having some other significance, such as to American Indians, be left undisturbed. Every effort is made to move a project to avoid disturbing an important site, but sometimes that is not feasible.

A research design is prepared for sites to be excavated. This outlines what questions the archaeologists will try to answer and the techniques they will use to excavate and analyze the data. The required consultation with American Indian tribes will also be reported. The agency which manages the land, the state archaeologist, and the President's Advisory Council on Historic Preservation will each review the research design to assure it meets professional standards. If all agree, the directing archaeologist is issued a permit to excavate.

Finally the excavation begins (Figure 2). The directing archaeologist assembles a team of excavators. These people may be working historians, archaeologists, students, and trained amateurs. The first step is to clear vegetation from the site and establish a grid on the surface (Lesson 15: "Gridding a Site"). The grid is the primary way to maintain **context**, the relationship artifacts and features have to each other. Archaeology is a destructive science; once a site is dug, you can't go back and do it differently. Researchers of the future can study a site they never saw if good notes and maps were made of the excavation. Recording context is the key to interpreting the site from records.



The grid is a Cartesian coordinate system. A grid is set up using a survey instrument (usually a transit), measuring tapes, and wooden stakes. Squares are marked on the ground using stakes for each corner; squares are most often 1 or 2 meters on a side. Each square has a unique identifying number from its grid coordinates. A map is made of the site on graph paper; the graph squares correspond to the squares on the ground. Any artifacts, samples or

features (such as a hearth or pit) that are found in that square are labeled with its grid number and the depth below the ground surface at which they were discovered.

Using shovels, trowels, screens, and measuring tapes, archaeologists uncover a site. They move dirt slowly because they don't know what they will be uncovering and they don't want to destroy something by being in a hurry. Each artifact is carefully measured and recorded as it is found. The excavated dirt is put in a mesh screen and shaken back and forth so that the dirt falls through and artifacts are left on the screen.

Numerous maps, drawings and photos are made during excavation. Everything refers back to the grid location. Artifacts and various kinds of samples (pollen, botanical, faunal, tree-ring, Carbon-14) are sent to specialists for analysis.

Once the excavation is completed, the site is usually filled back in with the excavated dirt. A development project will now be authorized to proceed.



Using the Data

Months after the excavation is completed, results of the analyses will be ready. The time spent actually excavating is the least time-consuming aspect of archaeological research. Processing samples and interpreting the data (Lesson 19: "Pollen Analysis", Lesson 18: "Archaeology and Tree-Ring Dating", Lesson 17: "Artifact Classification") take several times as long as excavation. Artifacts, records and photos are turned over to a public museum, or to the Indian tribe with jurisdiction after the analysis is complete. A public museum assures the availability of the artifacts and information to a researcher, as well as for use in a display.

Archaeologists make extensive use of computers and statistical data analysis (such as in Lesson 20: "Measuring Pots"). They compare their data with that derived from other studies. They may use ethnographic analogy—studying modern groups of people for clues about what archaeological patterns might mean, or what use artifacts could have had (Lesson 21: "Archaeology and Ethnographic Analogy: The Anasazi and the Hopi"). They address the questions they originally proposed in their research design.

Sometimes artifacts are experimentally replicated to learn what methods of manufacturing were used (Lesson 22: "Experimental Archaeology: Making Cordage").

A strong professional ethic dictates that excavation results be published, so that the information is available to everyone. Publications have most often been written in the idiom of professional archaeology, accompanied by all the jargon that any profession develops to talk to other professionals. There is a growing emphasis in professional archaeology to communicate with the general public, and to write and present information in more general terms.



Dating Archaeological Samples

Archaeologists have two ways of placing events, sites, and artifacts in chronological order. **Relative dating** can order things in relation to each other, but they are not anchored to a calendar (Lesson 16: "Stratigraphy and Cross-dating"). Think of a trash can; items on the bottom were placed there prior to the items on the top. Relative to each other, the items on the bottom represent older actions than those on the top, but we don't know what day or what year the trash can was filled.

Absolute dating can establish a calendar year for an artifact, site or event; and archaeologists have several methods to learn an absolute date. Tree-ring dating can be very precise, whereas Carbon-14 dating provides a range of possible dates, i.e. A.D. 500 ± 30 , means the date is between A.D. 470 and A.D. 530. To return to the trash can example, if something in the garbage had a date on it, like a newspaper or a postmarked envelope, then we could propose that the garbage in the same layer with it is also that old, and we know an absolute date for its disposal.

In the West, archaeologists use four absolute dating methods: tree ring, radiocarbon, obsidian hydration, and archaeomagnetic. Tree-ring dating is explained in Lesson 19.

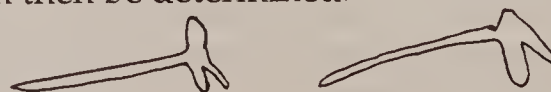
Radiocarbon dating (also called Carbon-14 or ^{14}C) can be used on anything organic, anything that once was living. The method was developed in 1949 by two physicists, W.F. Libby and J.R. Arnold and it revolutionized the young science of archaeology: "...living organisms build up their own organic matter by photosynthesis and by using atmospheric

carbon dioxide. The percentage of radiocarbon in any living organism is equal to that in the atmosphere. When the organism dies, the carbon-14 (^{14}C = a radioactive isotope) atoms begin to disintegrate to carbon-12 at a known rate, so that after 5,568 years, only half the original amount will be left; after 11,136 years, only a quarter, and so on. It is possible to calculate the age of an organic object, such as charcoal or wood, by measuring [through a laboratory procedure] the ratio of ^{14}C to ^{12}C left in the sample" (Fagan, 1978, p. 53).

Carbon-14 dating destroys the sample and requires a fair amount of material to date. About a quarter-cup of charcoal is needed for a ^{14}C date, for example. Sometimes archaeologists are reluctant to destroy an object, or there is not enough material for a standard ^{14}C date. Fortunately, there is a newer method of radiocarbon dating that requires very little organic material—about the size of the head of a pin is enough. This method is done with an accelerator mass spectrometer, and is called an **accelerator date**. An accelerator date costs two to three times what a standard ^{14}C date costs.

Obsidian hydration dating is based on the principle that all glass—natural and human-made—absorbs small amounts of atmospheric moisture. Obsidian (volcanic glass) was frequently used by prehistoric people to make tools. A fresh surface was exposed when the tool was made from an obsidian nodule, and so the absorption started on an unweathered surface. An hydration "rind" develops on the obsidian, and the rate of hydration can be determined. Therefore, by examining a thin slice of obsidian under a microscope and measuring the width of the rind, the age of the tool can be determined. Problems exist with this technique and it is not widely used. However, research continues and may make obsidian hydration dating a more reliable method.

Archaeomagnetic dating is based on the fact that the earth's magnetic poles have changed location over time. The time and path of the North Pole's wanderings is roughly known. Some soils contain tiny magnetic particles, such as iron oxide. When soil is heated above 670° , the particles are "loosened" in the soil, and when they cool the particles align with magnetic north. Archaeologists collect small cubes of burned earth, such as from around a hearth, and send them to an archaeomagnetic dating laboratory. The particles will be pointing to the place where magnetic north was at the time they were last heated and cooled, and the date of that event can then be determined.





Excavating a Site

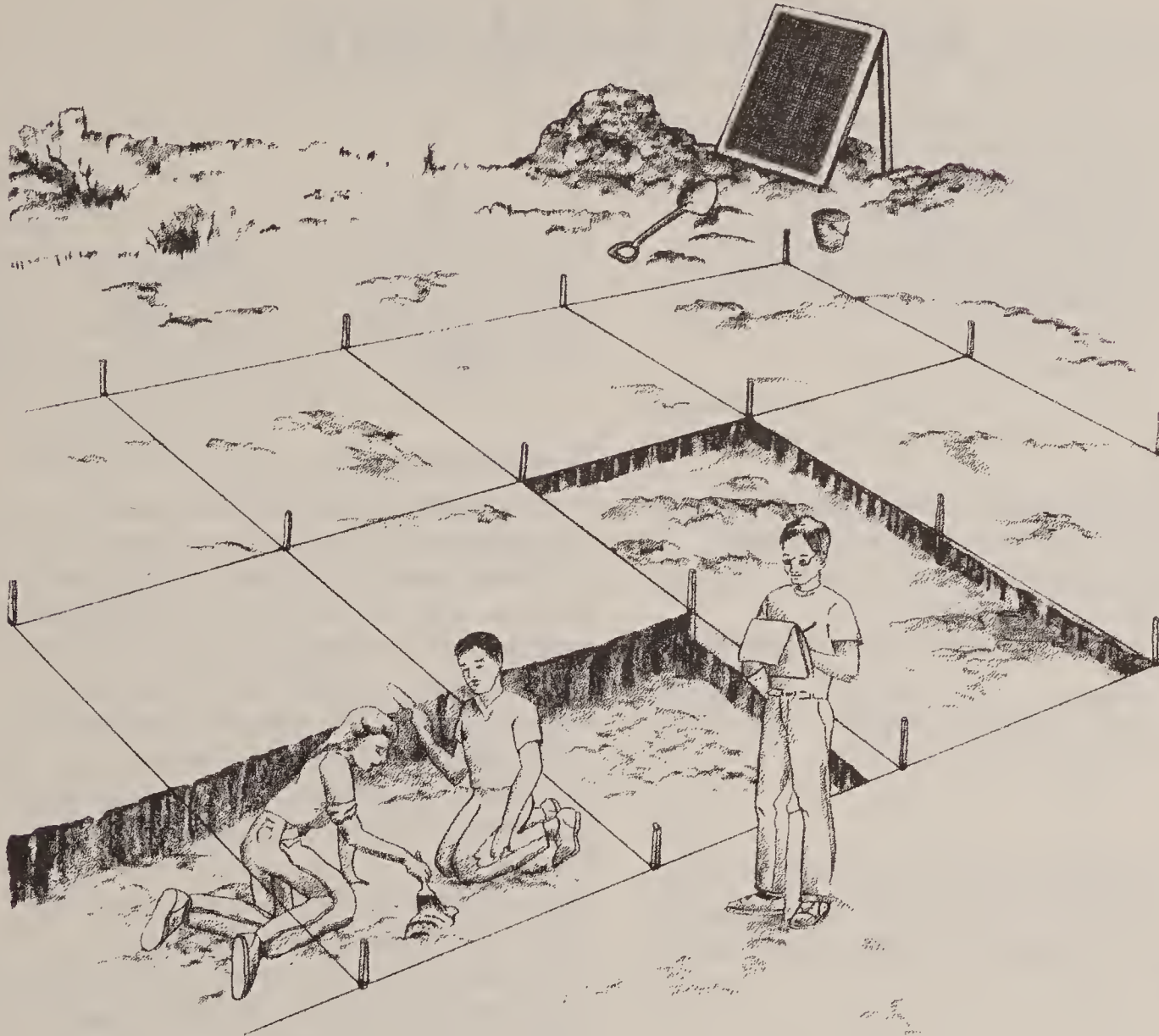


Figure 2. Drawing which shows how a site is excavated.



GRIDDING A SITE

SUBJECTS:	Science, mathematics, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Brainstorming, map reading, using scale, scientific inquiry
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; work teams of 2 to 4

Objectives:

In their study of site gridding students will use a map and the Cartesian coordinate system to:

1. Establish a grid system over an archaeological site, labeling each grid unit.
2. Determine the location of artifacts within each grid unit.
3. Construct a scientific inquiry concerning the location of artifacts on the site.

Materials:

Rulers, transparencies of "The Lakeside Site" activity sheet and "The Grid" master, "The Lakeside Site" and "Artifact Location Record" activity sheets for each team.

Vocabulary:

datum: something to use as a basis for measuring.

site datum: an arbitrarily established point from which the entire site is measured and recorded.

Cartesian coordinate system: two- or three-dimensional graph based on intersecting, perpendicular incremented lines or planes.

flake: a thin piece of stone removed from a nodule by striking it with a flaker made of bone, antler, or other stone. Flakes have sharp edges, and could be used as cutting implements. Flakes were also further shaped into tools or were left as waste by-products of flintknapping.

grid unit: a specific spatial area on the Cartesian coordinate system, designated by the coordinate in one corner (usually the southwest corner).



Background:

Archaeology is a destructive science. Once a site has been surface collected or dug, it is gone forever, and can never be replaced with another just like it. Because sites are destroyed during the excavation process, archaeologists record them on paper to preserve the context of all the artifacts and structures. Archaeologists of the future can study a site if good notes and maps were made of the excavation.

One way archaeologists preserve context on paper is through the use of the rectangular grid, or Cartesian coordinate system. The first step in the excavation process is establishing a grid. A site datum is set at an arbitrarily chosen location and is designated as (0,0). Two perpendicular axes intersecting at the site datum are then established and a rectangular grid is superimposed over the entire site. Each square on the ground is marked with numbered stakes in the corners, so that each square has a unique "name" referred to by its coordinates. The coordinates indicate the distance of a given point north, south, east, or west from the site datum.

Once the grid is established, all artifacts and structures are measured and recorded using the system. Before excavation actually begins all artifacts visible on the surface are collected and their location on the grid are recorded. As excavation proceeds, materials found under the surface are similarly recorded and collected. When the archaeologist returns to the laboratory, the maps and the data recorded in the field can be used to make inferences about past events and the lifeways of the site's inhabitants. The exact location of each artifact transported back to the laboratory is known—the object can be tied to its place in the site.



Setting the Stage:

Have the students imagine they are a team of archaeologists who have found an archaeological site. Artifacts, including projectile points, pottery sherds, and stone flakes are scattered on the surface of the ground. They want to make a map of the site. How might they accurately record the location of the artifacts? Have the students brainstorm ideas.

Procedure:

1. Project the map of the "Lakeside Site" and explain this is the site they have found. Overlay a transparency of the grid to demonstrate that an archaeologist establishes a grid over the site to assist with accurate recording of data. Share background information about the importance of gridding a site for current and future study.

2. Distribute the "Lakeside Site" activity sheet to each team. Point out the site datum in the lower left hand corner and explain that this is the point from which the grid is established. The name of the site datum is (0,0).

3. Using rulers, each team will establish a grid system using the scale 1"=1 meter.

4. Label each point on the grid. The southwest corner of each unit becomes the reference (designation) for that unit. Example: (1,2); (2,2); (2,3). Each coordinate indicates the location east and north of the site datum.

5. Using the "Artifact Location Record" students will record the grid unit designation and count and name the artifacts in each grid unit.

6. Following scientific inquiry ask:

a. What do you notice about the distribution of the pot sherds? (**observation**)

b. Why is there a concentration of pot sherds in part of the site? (**List some inferences.**)

c. Choose one inference and formulate an hypothesis from it. Describe how the hypothesis might be tested.

Example: There are a lot of pot sherds in one location. We might infer a pottery vessel broke here. If all of the sherds have similar attributes and fit together, then we could accept the hypothesis that a vessel broke in this location. What other reason could explain the concentration of sherds?

Note: The students will not be able to actually test the hypothesis without access to the artifacts. This exercise is designed to have them think like archaeologists.

d. Conduct a similar inquiry using the stone flakes or other artifacts.

Closure:

Summarize the importance of gridding archaeological sites to assist with accurate recording and making inferences about data now and in the future.

Extensions:

Extension 1. With older students map artifacts within each grid unit. Measure the distance north and east of each grid unit corner to find the exact distance of each artifact from the site datum (0,0). Examples: (2.1, 4.6) or (3.3, 8.8).

Extension 2. Create a site on the playground by depositing "artifacts", and then gridding the playground. Map the "artifacts" using the grid.

Links:

Section One, Lesson 4: "Context"

Section One, Lesson 7: "Scientific Inquiry"

Artifact Location Record Answer Sheet

Grid Unit	# Flakes	# Sherds	# Points
1,0	0	1	0
3,0	0	1	0
2,1	1	0	0
4,1	0	1	0
5,1	1	0	0
0,2	0	1	0
2,2	9	0	1
4,2	0	2	0
5,2	0	0	1
0,3	1	0	0
2,3	1	0	0
3,3	1	0	0
4,3	2	8	0
2,4	0	12	0
3,4	2	0	0
4,4	1	0	0
5,4	1	1	0
0,5	0	1	0
1,5	1	0	0
2,5	1	0	0
3,5	5	0	0
4,5	3	0	0
5,5	0	1	0
1,6	0	0	1
3,6	1	1	0
2,7	1	0	0
3,7	0	1	0
4,7	0	0	1





The Grid Sheet

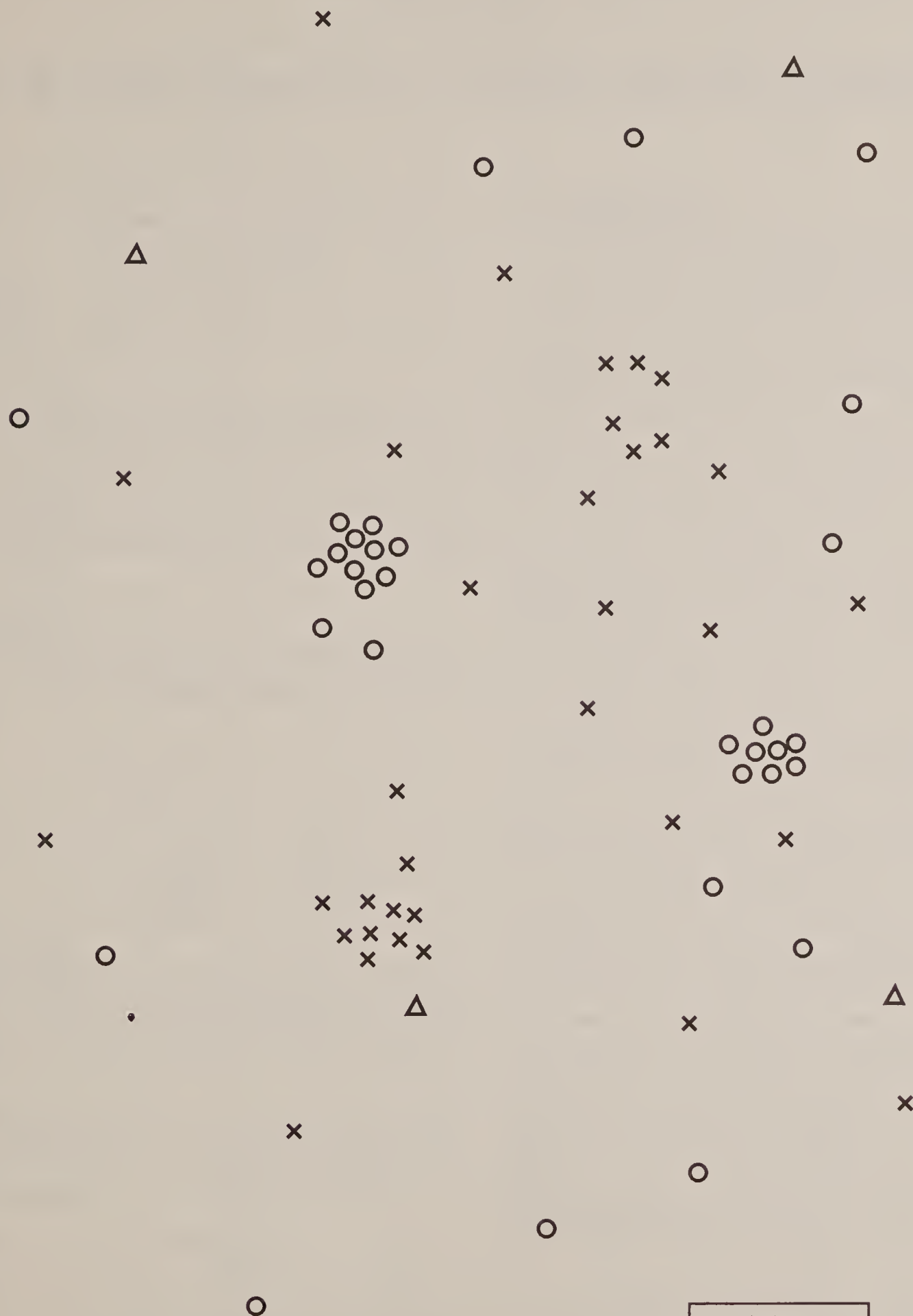
(0,7)	(1,7)	(2,7)	(3,7)	(4,7)	(5,7)	
(0,6)	(1,6)	(2,6)	(3,6)	(4,6)	(5,6)	
(0,5)	(1,5)	(2,5)	(3,5)	(4,5)	(5,5)	
(0,4)	(1,4)	(2,4)	(3,4)	(4,4)	(5,4)	
(0,3)	(1,3)	(2,3)	(3,3)	(4,3)	(5,3)	
(0,2)	(1,2)	(2,2)	(3,2)	(4,2)	(5,2)	
(0,1)	(1,1)	(2,1)	(3,1)	(4,1)	(5,1)	
(0,0)	(1,0)	(2,0)	(3,0)	(4,0)	(5,0)	

▲ Site Datum



The Lakeside Site

Name: _____



(0,0)



Site Datum

- | | |
|---|------------------|
| × | Flake |
| ○ | Sherd |
| Δ | Projectile point |



Name: _____

[illegible]



STRATIGRAPHY AND CROSS-DATING

SUBJECTS:	Science
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Observation, discussion
DURATION:	15 to 30 minutes
CLASS SIZE:	Any

Objectives:

In their study of stratigraphy students will use an activity sheet to:

1. Interpret archaeological strata using the law of superposition.
2. Apply cross-dating to determine the age of other artifacts.

Materials:

Five books of any size, "Site Near Richfield, Utah" and "Cross-dating" activity sheets for each student.



Vocabulary

cross-dating: the principle that a diagnostic artifact dated at one archaeological site will be of the same approximate age when found elsewhere.

diagnostic artifact: an item that is indicative of a particular time and/or cultural group; a computer would be a diagnostic artifact of the modern age.

spatial: concerned with space.

strata: many layers of earth.

stratigraphy: the arrangement of layers of earth representing different geologic events.

stratum: one layer of earth.

temporal: concerned with time.

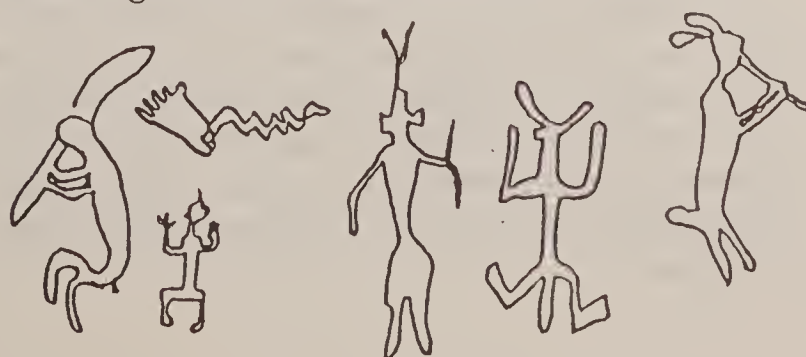
Background:

Natural materials such as rocks, soil, and plant and animal remains occur on the earth's surface and can accumulate in layers. Each layer may be distinguished by its physical characteristics: color, texture, and structure. Similarly, materials of human origin are also deposited onto the earth's surface. In archaeological sites natural and human-generated materials occur together in layers. These layers, called strata, form a record of past events that archaeologists analyze and interpret.

The materials deposited first are the oldest and are always found at the bottom of a given stratigraphic section. The most recently deposited materials are the youngest and are always at the top. This concept is known as the **Law of Superposition**. It always applies except when some type of disturbance has occurred.

Strata in archaeological sites provide archaeologists with temporal and spatial information. All of the artifacts in a given stratum will be of approximately the same age, while those in strata above or below will be younger or older respectively.

Cross-dating can indirectly establish a date for artifacts and sites. Artifacts such as stone points and pottery were made in distinctive styles through time. A modern analogy is automobiles: one would not mistake the style of a car made in the 1920s with one made in 1990. If an arrow point was found in association with a hearth that was radiocarbon dated to be 500 years old, it is assumed that the arrow point is the same age. When that style of arrow point is found at another site, the archaeologist would assign the site and the arrow point an age of approximately 500 years. Often cross-dating is the only method archaeologists have to determine the age of sites.



When an archaeological site is vandalized or artifacts are removed, knowledge about past cultures is lost forever. Damage to stratigraphy by unauthorized digging destroys the information that could be obtained under controlled scientific excavation. The removal of diagnostic artifacts from sites often removes all possibility to determine the site's age. If you see anyone digging in an archaeological site or taking artifacts, report them to law enforcement authorities.

Setting the Stage:

Stack five books on a table. Tell the students that the books were placed in their positions one at a time. Ask them if they know which book was placed in position first. Which one was placed last? This illustrates the Law of Superposition.

Now have the students imagine how thick the dust would be on a table if no one dusted it for a year. Each book represents a layer of sediment built up in a similar fashion for hundreds or even thousands of years.



Procedure:

1. Using the "Site Near Richfield, Utah" activity sheet as a guide, draw a layer near the bottom of the blackboard. Show how artifacts are deposited as people live on top of the layer. Then a new layer of sediments is deposited on top of that, by natural processes or by another group of people leaving different types of artifacts. This happens several times until the stratigraphy is built up to present-day levels.

2. Distribute the "Site Near Richfield, Utah" activity sheets to the students and have them answer the questions using the information on the stratigraphy drawing.

3. The artifacts on the "Site Near Richfield, Utah" activity sheet have been dated based on the age of the stratum in which they are found. If you found similar artifacts elsewhere, would you know approximately how old they are? Yes. This concept is known as **cross-dating**. An artifact type that has been dated in one place can be dated when found elsewhere.

4. Give the "Cross-dating" activity sheet to the students. Have them determine the approximate age of the artifacts based on the information from the "Site Near Richfield, Utah" activity sheet.

5. Ask the students if they would be able to study the stratigraphy of a site if the strata had already been mixed up by illegal digging. If someone took an arrow point, what kind of information would he or she have removed from the site?



Closure:

Summarize how archaeologists use stratigraphy and cross-dating to study archaeological sites.

Evaluation:

The students turn in their activity sheets for evaluation.

Extension:

Field trip. Examine the stratigraphy of road cuts. Measure and draw the layers on graph paper. Describe the strata by comparing differences in color and texture and other observable characteristics.

Links:

Section One, Lesson 5: "Chronology: The Time of My Life"

Site Near Richfield, Utah, Activity Sheet Answers

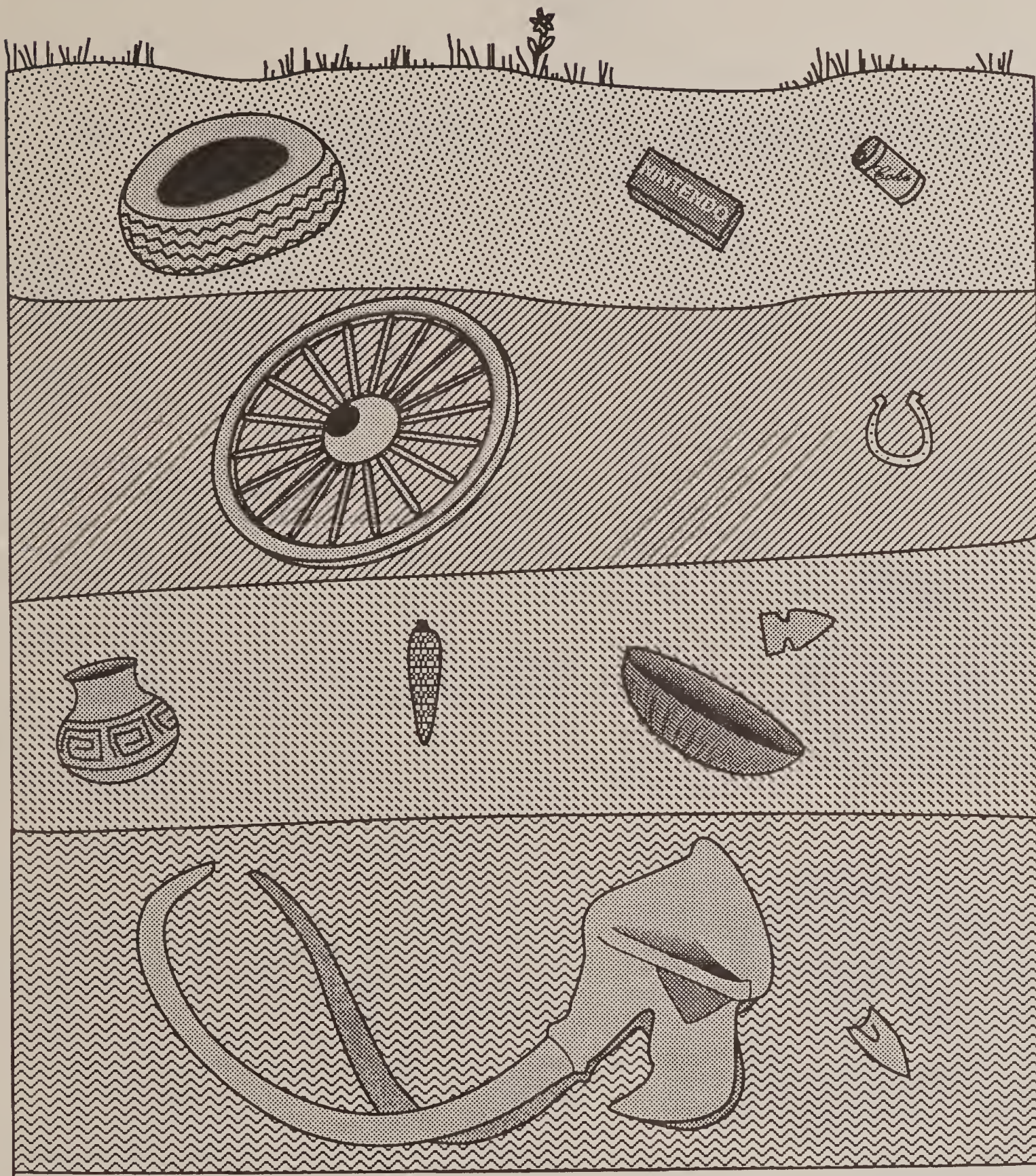
1. Modern Americans
 2. settlers
 3. Fremont or ancient farmers
 4. early hunters
 5. 4
 6. 1
-

Cross-Dating Activity Sheet Answers

1. 10,000 to 12,000 years ago
 2. 750 to 1,000 years ago
 3. 100 to 150 years ago
 4. 750 to 1,000 years ago
-

Site Near Richfield, Utah

Name: _____



1.
0 - 30
years ago

2.
100 - 150
years ago

3.
750 - 1,000
years ago

4.
10,000 - 12,000
years ago

Who left these artifacts?

1. _____

2. _____

3. _____

4. _____

5. Which people
came first? _____

6. Which people
came last? _____



Cross-Dating

Name: _____

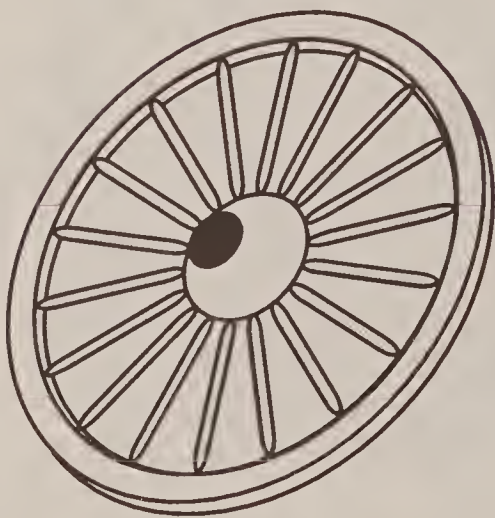
An archaeologist found these artifacts near Tooele. What is their approximate age?



1. _____



2. _____



3. _____



4. _____



ARTIFACT CLASSIFICATION

SUBJECTS:	Science, language arts
SKILLS:	Application, analysis, evaluation
STRATEGIES:	Scientific inquiry, research skills, classifying, role playing
DURATION:	30 to 45 minutes
CLASS SIZE:	Any; work groups of 4 to 5

Objectives:

In their study of artifact classification students will use pictures of artifacts or the teaching kit to classify artifacts and answer questions about pre-historic lifeways.

Materials:

"Anasazi Artifacts" and "Classification" activity sheets for each group; Archaeology Teaching Kit (optional).

Vocabulary

artifact: any object made or used by humans.

sherd: a broken piece of pottery.

Background:

The purpose of archaeological research is to learn about the lifeways of past peoples. The research design developed for each archaeological project usually consists of a series of questions and how they will be answered using the archaeological data.

The artifacts from the site form an important part of the data base with which to answer the research questions. The scheme used to classify the artifacts can be helpful in answering these research questions.

Procedure:

1. Tell the students to imagine they are a team of archaeologists. The team has completed excavation of an Anasazi site in southern Utah. They are now ready to begin analyzing the artifacts brought back to the laboratory to find out about the people who lived at the site. They will use a series of questions to structure their inquiry.

- What was the diet of the site's residents?

- What did they use for personal adornment?
- How many different ways did they decorate their pottery?
- How many different kinds of raw materials did they use to make their tools?

2. Distribute the "Anasazi Artifacts" and "Classification" activity sheets. Working individually or in small groups, the students cut out the artifacts on the "Anasazi Artifacts" activity sheet. They group the artifacts so they can answer the questions on the "Classification" activity sheet. Have the students answer the research questions and tell how they classified the artifacts to do that.

3. As the students work they will find that objects move from one category to another depending on the question asked. For example, the two pieces of shell could be used to answer questions concerning the Anasazi diet and adornment. Thus, they could be classified as food remains and as jewelry.

Closure:

Summarize what you have learned about classification and answering archaeological research questions. Have students create one or more questions of their own. How might they classify their objects to answer these questions?

Evaluation:

The students hand in the "Classification" activity sheet for evaluation.

Links:

Section One, Lesson 6: "Classification and Attributes"

Section One, Lesson 7: "Scientific Inquiry"

Classification Activity Sheet Answers

1. corn, beans, meat, and shellfish
 2. turquoise and shell
 3. checkerboard, lines, dots, shapes, and plain
 4. bone, stone, plant fibers, shell, and clay
-



Anasazi Artifacts

 Pottery 1	 Bone awl 2	 Pottery 3	 Pottery 4
 Pottery 5	 Pottery 6	 Stone 7	 Pottery 8
 Corn 9	 Pottery 10	 Pottery 11	 Bone 12
 Stone 13	 Basketry 14	 Turquoise 15	 Shell 16
 Pottery 17	 Shell & cordage 18	 Bone 19	 Pottery 20
 Beans Corn 21	 Stone drill 22	 Pottery 23	 Pottery 24



ARCHAEOLOGY AND TREE-RING DATING

(Adapted from *Date a Tree*, by Barbara Groneman, 1986, Southwest Learning Sources and the Arizona Archaeological Council.)

SUBJECTS:	Science, social studies, mathematics, language arts
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Computation, observation, forecasting, discussion
DURATION:	45 to 60 minutes
CLASS SIZE:	Any

Objectives:

In their study of dendrochronology students will use activity sheets and a discussion to:

1. Apply principals of dendrochronology to determine a tree's age and to recognize climatic variation.
2. Analyze and experience how archaeologists use tree rings to accurately date archaeological remains and study past climates.

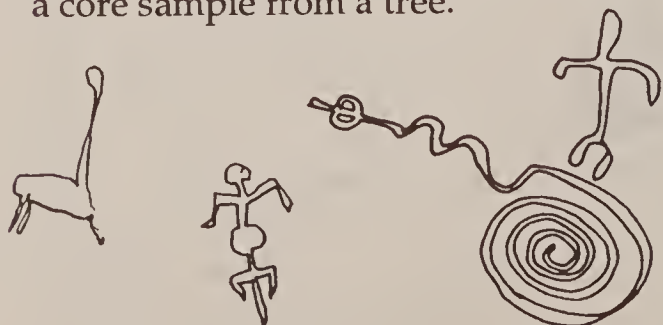
Materials:

"The Stump" and "Be A Dendrochronologist" activity sheets, scissors, glue or Scotch tape, (optional: tree cookies), and transparency of "Be A Dendrochronologist".

Vocabulary

dendrochronology: determining the age of a tree by counting its rings; the study of tree-ring dating.

increment borer: an instrument used to remove a core sample from a tree.



Background:

Dendrochronology (den-droh-cruh-NOL-uh-jee), also called tree-ring dating, is based upon the fact that trees grow in width by adding an outer layer, usually one per year. When looking at a cross section of a tree trunk, these yearly layers appear as light and dark rings of varying widths. The layer next to the bark is the most recent yearly growth, and the center of the tree is the first year of growth. One pair of light and dark rings results from one year's growth. The light colored section is the spring and summer growth when the tree has a lot of sap. As the weather cools, and the tree slows its growth rate, the cells become smaller and thicker-walled. Finally, the sap stops flowing and the tree ceases to grow during the winter, forming a smooth dark ring. By counting the dark rings, the age of a tree can be known if the cross section of the trunk is complete.

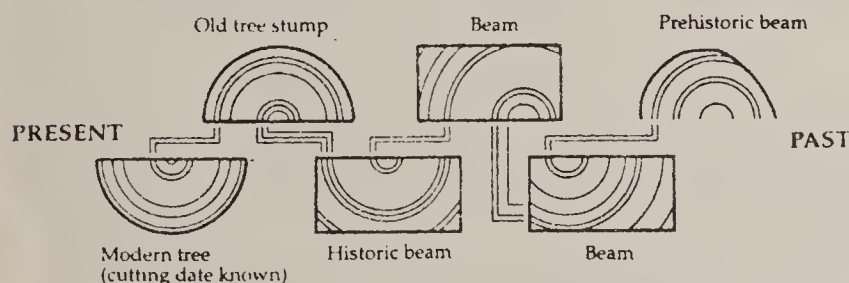
In the arid West, trees seldom have sufficient moisture to grow to their yearly maximum potential. The width of the tree rings varies with the growing conditions of each year. For instance, higher rainfall and a longer growing season produce a wider ring than does a year of low rainfall and prolonged cold. Tree rings can thus tell us about year-to-year climatic conditions in the region in which the tree grows. The tree-ring patterns have been found to never repeat in exactly the same way.

Dendrochronology was first studied in 1904 by Dr. Andrew E. Douglass, an astronomer at the University of Arizona. He was trying to analyze climate, and he soon noticed that the trees showed the same patterns of ring widths, because they had all experienced the same climatic conditions. In order to study climate further back in time, Douglass analyzed wood from prehistoric Indian ruins in the Southwest. He used a "bridging" method, called cross-dating, to do this.

First, he looked at trees recently cut, so that he knew the exact year that the tree added its last growth ring. By counting inward and subtracting the number of rings from the year the tree was cut, the year that tree started to grow could be calculated.

The cutting year of another piece of wood can be determined by matching its tree-ring pattern with the pattern of a piece of wood whose cutting year is known. Say there was a drought 50 years ago, appearing as a very narrow tree-ring. This narrow tree-ring will appear in all the trees in the area, but at different positions in the stump, because the trees are of different ages. The drought ring may be during one tree's second year of growth, in another's 75th year of growth.

A master sequence is made by drawing vertical lines on a piece of paper at the end of every tree ring. The sequence is a series of parallel lines; the width between each line is the same as the width of each tree ring. By continually matching and recording the ring patterns of older and older pieces of wood, a master sequence of tree-ring patterns is now extended as far back as 8700 years in some places.



A master sequence of ring patterns is prepared for different regions, since rainfall and temperatures, and hence tree ring widths, vary from place to place. The master sequence is represented on a slip of paper with vertical lines drawn on it, which match tree rings of a known date. The dendrochronologist makes a graph of the ring patterns for the particular piece of wood he or she is studying, then slides it along the master sequence until the patterns match. The cutting date of the piece of wood is now known.

Dendrochronology is particularly valuable to archaeologists since it can tell them very precisely how old a site is. Many ruins still have wood preserved in their walls and roofs, and even charcoal from a burned structure or a cooking fire can sometimes show clear tree-ring patterns. Archaeologists are also very interested in knowing about past climate since it influenced where people lived, what kinds of foods they grew, and what wild plants and animals were available to them.

Rather than remove a beam from an ancient structure, dendrochronologists use an increment borer, a small drill which removes a thin tube of wood from the beam. This borer will leave a hole in the beam that is only about the size of a soda straw.

This method of core removal is also used on living trees so that the tree does not have to be cut down.

By studying many pieces of wood from a prehistoric village, archaeologists can learn about such things as the village growth history, remodeling, site abandonment and re-use. When people returned to a village that had been abandoned for several years, they would repair, replace, and sometimes remodel the buildings, using new wood. The year of their return can be read from the tree rings of the new wood.

Wooden beams, building materials, and charcoal provide a wealth of information about past cultures. However, today people sometimes destroy this evidence when they visit Indian ruins. Ancient houses have been pulled apart and the beams used in a campfire. Illegal digging in ruins can also move beams and charcoal from their original location, and then archaeologists cannot tell their context. It is very important to our knowledge about the past that we visit sites with care, and not disturb or destroy anything that is there.



Setting the Stage:

1. Share background information.
2. Using "The Stump" activity sheet or tree cookies, show students how to count tree rings and discuss the basic knowledge that can be learned from the study of tree rings.
3. Complete the activity sheet.

Procedure:

1. If possible, bring in an increment borer and a core sample. Foresters with state and federal agencies might lend these to you. Demonstrate or share how the borer is used and how the sample can be read, similar to the tree stump.
2. Give each student a copy of the "Be a Dendrochronologist" activity sheet. It depicts cross sections of two beams from different archaeological sites. Have students cut out the core samples, like a dendrochronologist taking a core sample. The students match their core samples to the master sequence. Glue the samples from each core onto the master sequence to see how the beams overlap and to date and place them in chronological order. (You may want to demonstrate or work along on the overhead projector.)

3. After students have dated the beams and put them in order, ask them to make some observations about the climate at these different sites. What might have been the weather conditions at that time? How would the weather have affected farmers?

4. Share preservation information from the "Background."

Closure:

Have the students create a summary statement about the importance of tree-ring dating to archaeology. Have them also make a statement about the importance of preserving wood samples in archaeological sites.



Evaluation:

Students complete "Be a Dendrochronologist!" activity sheet and turn it in for evaluation.

Extensions:

Extension 1. Instead of using "The Stump" activity sheet teachers can use "Tree Cookies," which are polished cross sections of tree stumps and limbs. Tree Cookies are available for loan to members from the Utah Society for Environmental Education, 328-1549.

Extension 2. An illustrated flyer describing the reading of tree cookies in more detail can be received, free of charge, from the U.S. Forest Service in Ogden, Utah.

Extension 3. *Project Learning Tree* has an excellent tree ring activity.

Link:

Section Two, Lesson 13: "The Anasazi People"

References:

McGregor, John C., 1974, *Southwestern Archaeology*. 2nd ed. University of Illinois Press, Chicago, IL.

Trefil, James S., 1985, "Concentric Clues From Growth Rings Unlock the Past." *Smithsonian*. July:46-55.

Tales the Trees Tell, 1977, *National Science Foundation Mosaic* 8(5):2-9.

Western Regional Environmental Education Council and the American Forest Foundation, 1988, *Project Learning Tree*. The American Forest Council, Washington, D.C.

The Stump Activity Sheet Answers

This tree was cut three years ago. Write that year ____.
How old is the tree? 16 years old
What year did the tree start growing? The year it was cut minus 16.
In what year of growth was there the least rainfall? 6
In what year of growth was there the most rainfall? 8

Be A Dendrochronologist Activity Sheet Answers

1. Climate and the years the site was occupied.
2. It could be skewed. However, if archaeologists find that some beams date well before the others at a site, they would suspect that the early beams had been re-used.
3. Removing beams removes information about the site's date and climate. Moving beams around confuses the record, and archaeologists cannot then tell to which room the dated beam belongs.
4.
 - a. Which beam is the oldest? B
 - b. How old was Tree A when it was cut? 14
Tree B? 13
 - c. How many years ago did Tree A start growing?
990 Tree B? 1000
 - d. How many years ago was Tree A cut? 977
Tree B? 987
5.

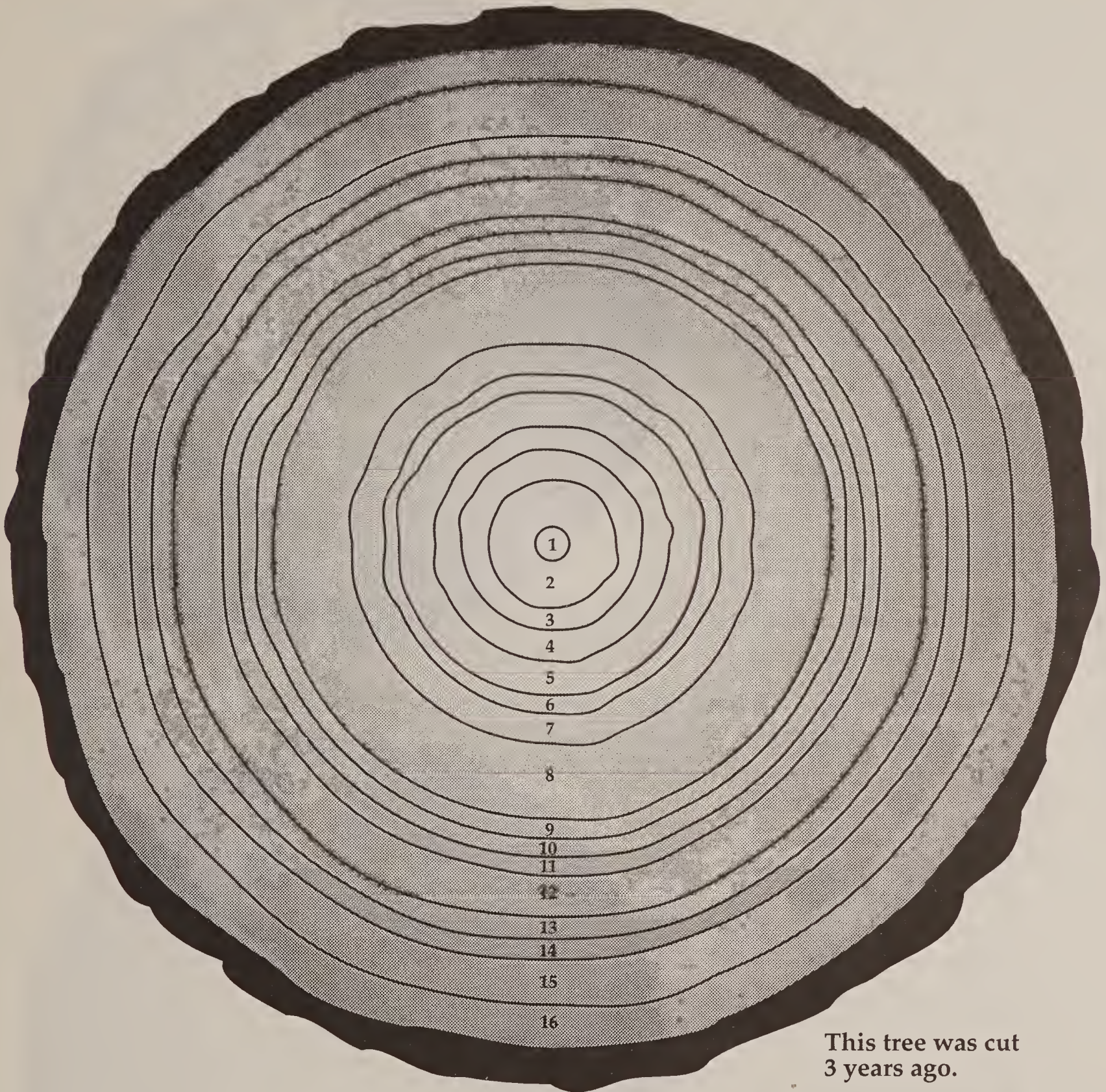
Tree A:	dry cycles - 1	wet cycles - 2
Tree B:	dry cycles - 2	wet cycles - 2
6. Examples: availability of food and water and other resources might change; survival might depend on adapting to these changes; human populations might change.





The Stump

Name: _____



This tree was cut
3 years ago.

Write that year _____

How old is the tree? _____

What year did the tree start growing? _____

Find the ring that grew the year you
were born. Was it a wet or dry year? _____

In what year of growth was there the least rainfall? _____

In what year of growth was there the most rainfall? _____



Be A Dendrochronologist

Master Sequence



**Be a Dendrochronologist****Name:** _____

What can a tree tell us?

1. Name two things archaeologists can learn about a site from tree-rings.
2. How is the tree-ring record affected if prehistoric people used wood beams from older sites when building new homes?
3. What happens to the archaeological record if someone removes a beam or even places it somewhere else on a site?
4. Refer to Page 1 of your "Be a Dendrochronologist" activity sheets:

Which beam is the oldest? _____

How old was Tree A when it was cut? _____ Tree B? _____

How many years ago did Tree A start growing? _____ Tree B? _____

How many years ago was Tree A cut? _____ Tree B? _____

5. What can you say about the climate where the trees grew?

Tree A:

List the number of dry cycles (two or more dry years) _____

List the number of wet cycles (two or more wet years) _____

Tree B:

List the number of dry cycles (two or more dry years) _____

List the number of wet cycles (two or more wet years) _____

6. How might climatic changes have affected the lifeways of prehistoric people?



POLLEN ANALYSIS

SUBJECTS:	Science, math, language arts
SKILLS:	Knowledge, comprehension, application, analysis, synthesis, evaluation
STRATEGIES:	Brainstorming, forecasting, discussion, problem solving, writing, and graph reading
DURATION:	45 to 60 minute period
CLASS SIZE:	Any

Objectives:

In their study of pollen analysis, students will use pictures of pollen grains, an activity sheet and a graph to:

1. Identify six pollen grains and the climatic conditions in which they grow.
2. Infer prehistoric climate and plant foods by interpreting two pollen samples.
3. Determine how climate affected a prehistoric village by interpreting a graph of pollen frequency through time.

Materials:

Transparency of "Magnified Pollen Grains," master "Two Pollen Samples," and "Pollen Change Over 200 Years" activity sheets for each student.

Vocabulary

coprolites: fossilized human feces.

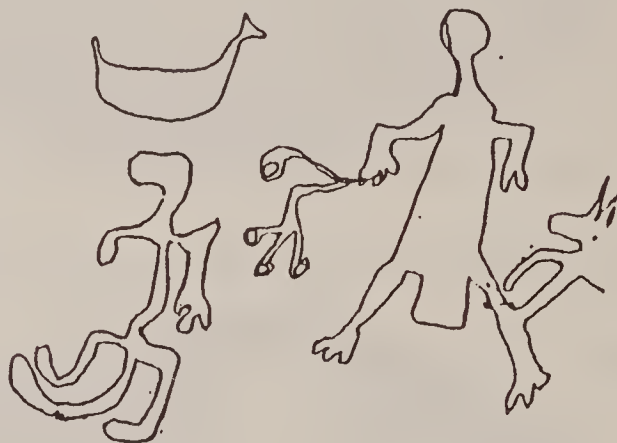
palynology: the study of pollen grains.

pollen: a powdery substance produced by flowering plants. Pollen is the male genetic material, which pollinates (fertilizes) the female part of the flower to produce fertile seeds.

Background:

Pollen has **four** very valuable features which make it useful for study (Moore and Webb, 1978, p.1). Most importantly, it is **preserved** over enormous timespans if it is buried and maintained in fairly constant environmental conditions. Pollen grains have been found preserved in rock millions of years

old. Other plant parts (leaves, flowers, stems) are far less likely to be preserved. Secondly, pollen grains, because of their very **small size**, tend to be carried in air currents. Thirdly, plants produce **great amounts** of pollen. These factors mean that pollen grains are dispersed widely, and it is likely that many of the plants growing in a region will be represented in a pollen sample. Finally, different kinds of plants produce different looking pollen grains. This **distinctiveness** allows identification to (usually) the genus level and, in some cases, to the species level.



Pollen becomes deposited in sediments by settling out of the air onto the ground surface where it becomes buried. Pollen also shows up in areas of a site where people processed plants, such as in hearths and storage rooms. When archaeologists are excavating a site they regularly take pollen samples—small bags of sediment—which are sealed and sent to a palynologist. Pollen is recovered through a laboratory procedure called "pollen extraction," which essentially involves dissolving the sediments and leaving the pollen, which is then placed on a microscope slide. Magnifying the grains 400 to 1000 times, palynologists count and identify the pollen. They are then ready to begin interpreting their results.

Archaeologists use pollen analysis to understand **plant use** and **past climates**. The study of archaeological pollen can tell us if people were growing their own food or relying upon wild plants, or some combination of both. It is possible to learn about past climates because every plant species has specific requirements for temperature and moisture.

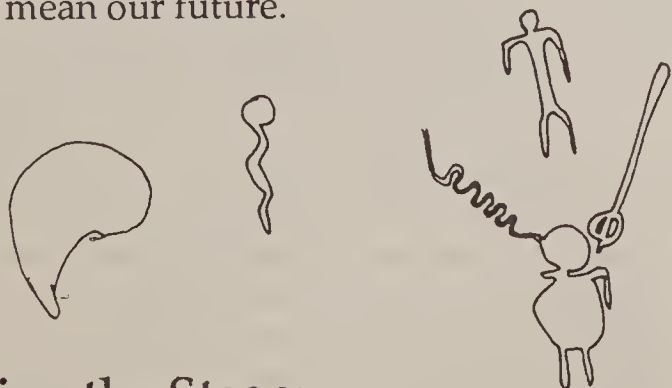
Palynologists can infer what the climate had to have been to support the plants represented in the pollen record. The concern about global warming makes it important to understand long term climatic change, so that archaeologists can separate natural climatic cycles from human-caused changes.

Weather patterns on a local level are directly relevant to us today as well. For example, palynologists are finding patterns in long- and short-term droughts in the Southwest. As population here grows and as water becomes more scarce, such information could be invaluable.

Pollen has other uses besides providing clues about past climates and past people. Pollen is a very nutritious food, high in protein. Corn pollen is fed to livestock as a dietary supplement, and some people claim pollen has medicinal healing effects (Stanley, 1971). Prehistoric people used pollen as a food. Cattails produce abundant pollen, and Fremont people apparently used it as a flour (Madsen, 1979). Coprolites found in Great Basin caves show that Archaic people were eating the pollen of cattails, grasses, cottonwood trees, and various other plants.

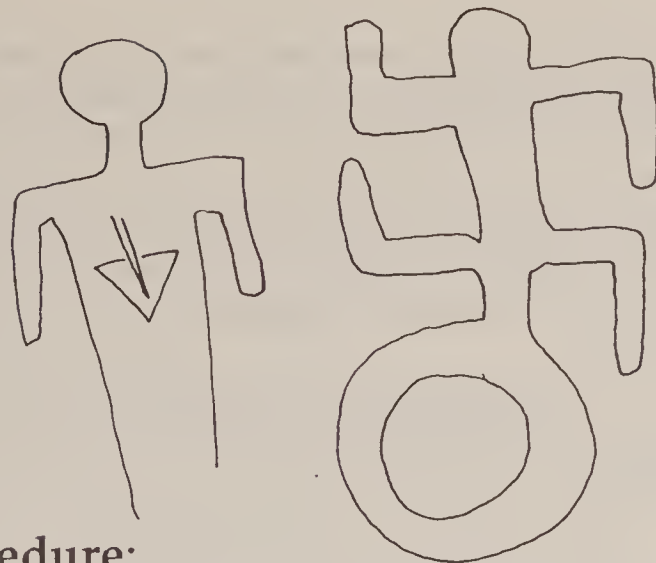
Pollen has a special spiritual meaning to some Indian people. Corn pollen represents the power of fertility and reproduction, and is an element in many rituals of the Hopi, Zuni, and Rio Grande Pueblo people (Waters, 1972, p.162). To the Navajo people, pollen of "corn and other plants is very important in maintaining the proper relationship to the Holy People. In [traditional] households the day still begins with the sprinkling of pollen from one of the little bags and a brief murmured prayer" (Kluckhohn and Leighton, 1974, p. 203).

Sites that have been dug up by looters looking for artifacts have lost their potential to tell us about past climates. Looters mix layers from earlier times with those from later times and expose previously sealed layers to contamination with modern pollen. They probably do not even realize they are destroying this fascinating evidence of the past, but they are. It is up to everyone to preserve our past. It could mean our future.



Setting the Stage:

Project the master of "Magnified Pollen Grains," covering the title. Ask the students to guess what they are looking at.



Procedure:

1. Using the projected master of "Magnified Pollen Grains," review from which plant each grain comes. If possible, bring examples of the plants to the classroom. List on the board what students know about the conditions where that plant typically grows.

pine: cool and moist, usually in the mountains

cattail: wet, marshy

sagebrush: warm and dry, typically in deserts

corn: domesticated crop, requires warmth and moisture

Mormon tea (ephedra): warm and dry, desert plant

dandelion: grows in disturbed areas such as in farm fields and yards; thrives on warmth and moisture

2. Ask students to imagine uses for the listed plants. Supplement their list with the following information about how prehistoric people used them (from Wheat, 1967, and Fowler, 1986).

pine: building material, firewood, edible pine nuts

cattail: edible roots, flowers, stalks and pollen; leaves used for making rope, mats, bedding, and temporary brush structures

sagebrush: medicine, firewood, bark woven into mats and clothing, edible seeds

corn: cobs used as fuel, grain eaten fresh or ground into flour, pollen used ritually

Mormon tea: edible seeds, foliage used for tea

dandelion: edible greens (The dandelion that grows in our yards today is not a native plant. A relative of the dandelion is native and was used by prehistoric people.)

3. Present background information about how pollen analysis is done and how archaeologists use pollen analysis to learn about prehistoric environments and food plants.

4. Distribute the "Two Pollen Samples" activity sheet. This is a very simplified version of what actual pollen samples might look like. Explain that the activity sheet reports the results of two pollen

sample analyses: one sample is from a hearth of a 1000-year-old site, and the other sample is taken from outside the site limit at a depth that is the same age as the hearth. (For this exercise, assume that pollen from the hearth got there by direct human action, and that the pollen in the sample from outside the site settled out of the air from the plants growing nearby.)

5. Students identify the plants for each pollen grain and write a paragraph interpreting the results from each sample. Examples:

hearth sample: people were fixing a meal of corn, dandelion greens and pine nuts. Since corn and nuts are storable and greens are not, we can infer that this meal was being cooked in the spring or summer when dandelion greens are available. Pine nuts must have been gathered far away, based on the results of the other pollen sample. The sample also demonstrates use of wild and domesticated plant food. Alternatively, the pine pollen could have come from firewood instead of pine nuts; the presence or absence of pine nut hulls or pine charcoal from the hearth could clarify which use was occurring.

outside of site sample: the site is located in a desert environment, because of the presence of sagebrush and Mormon tea. However, a water source (spring, marsh) must have been very close by, since cattails are present.

6. Distribute the "Pollen Change Over 200 Years" activity sheet. Be sure students understand that the vertical line on the left indicates time and that the graphs show an increase in amounts moving from left to right. Ask them to identify the pollen grains and interpret the graph. Specifically, how was the climate changing over the 200 years, and how did this affect the villagers? An example:

The climate is cooling and becoming wetter, as shown by the increase of pine pollen. People were growing corn, and along with it in their disturbed fields grew dandelions. Therefore corn and dandelion increase and decrease together. By 850 years ago the climate appears to have become too cool to grow corn successfully, and people abandoned the site at that time.



Closure:

In summary, what two kinds of information can pollen from archaeological sites tell us? Why is it important that sites be left undisturbed if archaeologists are to use pollen analysis to learn about past climates and how people lived?

Evaluation:

Evaluate students on their identification of the pollen grains and the application of their knowledge to interpreting the pollen sample results.



Extension:

The following questions enable students to apply their knowledge of pollen analysis to problem solving. Pose the questions either as class discussion topics or as a quiz.

1. What would you know about the past climate of your town if pollen from an archaeological site 1000 years old showed that coconut palms and pineapples had grown here? (In Utah, no such evidence has been recovered, and this situation is presented to illustrate the inference process.)

The climate must have been warmer and moister than today, with a moderate climate all year round. We know this from examining the climate where coconut palms and pineapples grow today.

2. A man accused of murder has been caught, but he says he has never been in the forest where the body was found. He claims that he was in the desert at the time of the murder, and he is wearing the same muddy clothes he had on then. He says that he got muddy when trying to remove his truck from a mud hole in a jeep trail. How might you use pollen analysis to discover where he really was?

A situation similar to this actually happened. "A man was arrested and charged with the murder of another man while on a journey along the Danube near Vienna; however nobody could be found. Pollen analysis of a soil sample from the arrested man's shoes revealed much pine and alder pollen . . . Fortunately, only one area was known along the Danube where pine and alder grew together . . . so the suspect was confronted with this fact. He was so shocked at the deduction that he admitted the crime and the precise location where he had hidden the body" (Moore and Webb, 1978, p.7).

3. You know of an ancient well-preserved Indian village near your home. Citizens of your town are trying to decide whether they should build a very expensive reservoir to conserve water in case of another drought. One evening, you are out for a walk and meet some people who are talking about going up to the Indian village to dig for artifacts. What might you tell them is wrong with doing that? What kind of information important to your town could they be destroying?

In digging the site, they destroy information about past people and about past climates. It is also against the law to dig sites on public lands. The site could be a storehouse of information about past climates, information which could be very useful to the citizens of the town as they consider the reservoir. They could learn the pattern and duration of droughts in the area over hundreds of years through analyzing pollen contained in the site's deposits.



Link:

Section One, Lesson 3: "Observation and Inference"

References:

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Stanley, Robert G., 1971, "Pollen Chemistry and Tube Growth." In *Pollen Development and Physiology*, edited by J. Heslop-Harrison, pp. 131-155. Butterworth and Co., Toronto, ON.

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Wheat, Margaret M., 1967, *Survival Arts of the Primitive Paiutes*. University of Nevada Press, Reno, NV.

Two Pollen Samples Activity Sheet Answers

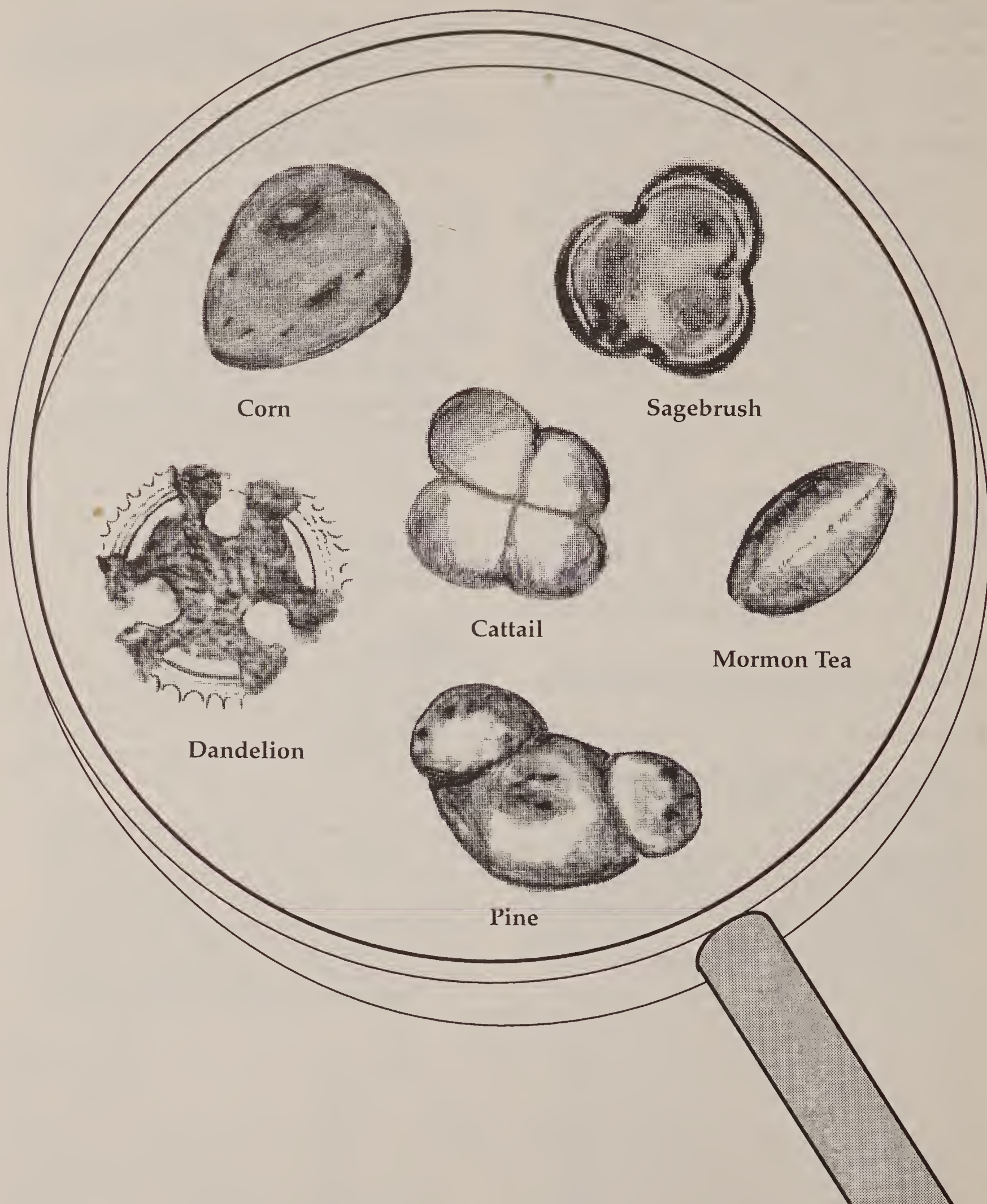
1. corn
 2. dandelion
 3. pine
 4. sagebrush
 5. cattail
 6. Mormon tea
-

Pollen Change Over 200 Years Activity Sheet Answers

1. pine
 2. corn
 3. dandelion
-



Magnified Pollen Grains



Two Pollen Samples

Name: _____

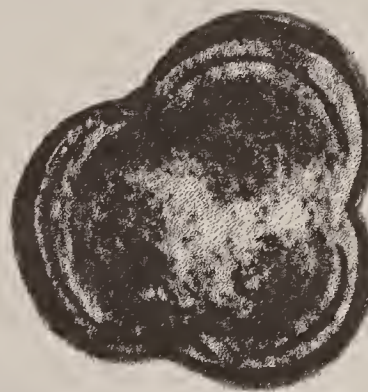


Sample from a 1,000 year
old hearth, deposited by
human activity

Sample from outside site at ground
level from 1,000 years ago,
deposited by natural proceses.



1. Name of plant _____



4. Name of plant _____



2. Name of Plant _____



5. Name of plant _____



3. Name of Plant _____

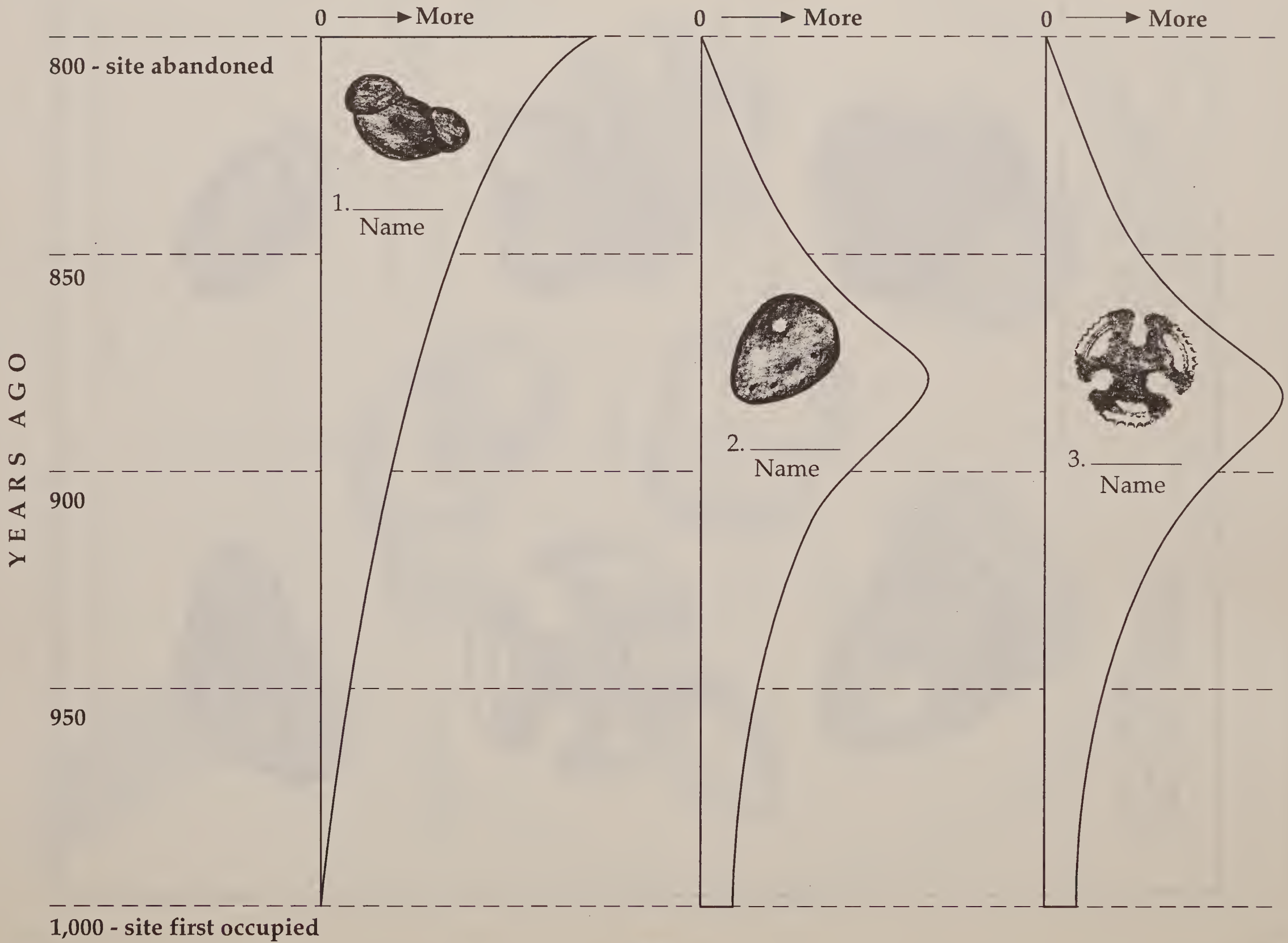


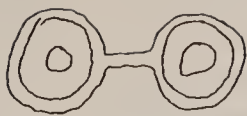
6. Name of plant _____



Pollen Change Over 200 Years

Name: _____





MEASURING POTS

SUBJECTS:	Science, mathematics
SKILLS:	Knowledge, comprehension, application, analysis, evaluation
STRATEGIES:	Brainstorming, computation of circumference, analogy, discussion
DURATION:	45 to 60 minutes
CLASS SIZE:	Any



Objectives:

In their study of measuring pots students will use an activity sheet or pottery sherds to:

1. Compute circumference from a section of a circle.
2. Construct analogies about possible functions of ancient or historic ceramics based on their own experience.

Materials:

"Broken Pots" activity sheet for each student, or sherds from the Archaeology Teaching Kit, or sherds from broken modern vessels.

Vocabulary

sherd: a piece of broken pottery.

vessel: a hollow or concave utensil for holding something.

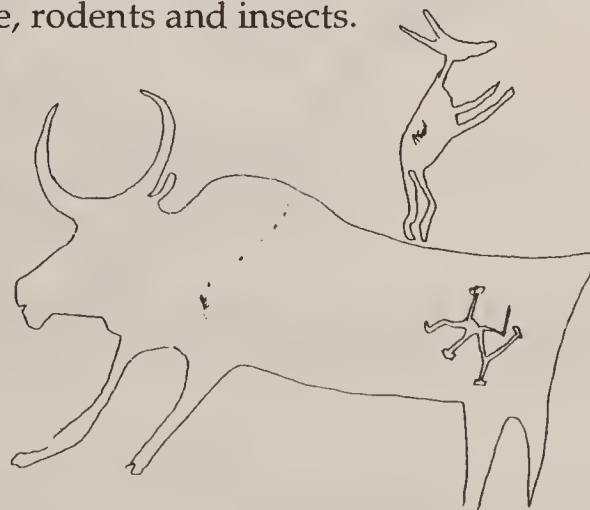
Background:

One of the most common types of artifacts that archaeologists find in Utah is pottery. Fired clay vessels are very durable, and will last for thousands of years, even if they are laying on the ground surface. Because styles are distinctive to particular groups of people and changed over time, pottery is

of great assistance to archaeologists in determining how old a site is, and which group of people lived there. Archaeologists also want to know what certain pottery vessels might have been used for: were they for cooking, serving, or storing food or other substances?

Because pots are most often found broken into hundreds of pieces (sherds), it is a tedious, and often impossible job to glue them all back together. One quick way to get an idea of how large a pot was is to calculate the original circumference. Using a rim sherd will indicate how large the opening was.

If enough of a pot is present, it is possible to calculate its volume, or storage capacity. Many clues about how a group of people lived can be gained by studying vessel sizes and shapes. The storage capacity of vessels allows calculation of how much stored food people had, and from that, estimates are possible of how many people lived at a site. Functions of different sizes of pottery can also be determined. A small-necked vessel probably stored liquids or very small seeds, rather than large seeds. Large open vessels, such as bowls, probably weren't used for storage, since they would be difficult to seal from moisture, rodents and insects.



Setting the Stage:

Spread some modern pottery sherds on a table. Have the students imagine they are sherds found at an archaeological site. What are some questions that archaeologists might ask about the sherds? Brainstorm ideas. One question archaeologists might ask is: "How big were the pots from which these sherds came?" How would they find out?

Procedure:

(Note: Real prehistoric artifacts from the Archaeology Teaching Kit or broken modern ceramic vessels can be used for this lesson. Use pots with rims of different circumferences.)

1. Share the background information about why archaeologists study prehistoric ceramics and how they use the information to study the lifeways of past people. Include a short section on how different sized and shaped vessels are used for different purposes.

2. Calculate the circumference of a pot represented by a sherd or the activity sheet sherd drawing. If you are using real pottery sherds, lay a rim sherd finished side down on a sheet of paper and trace around its inner edge. Use either the rim tracing or the first sherd on the activity sheet, and measure a straight line between two points on the curve. Measure the length of that line (C, chord length), calculate its midpoint and then measure the distance from the midpoint to the curve edge (M, middle ordinate).

3. The formula to calculate the radius (r) of a circle from a portion of it is:

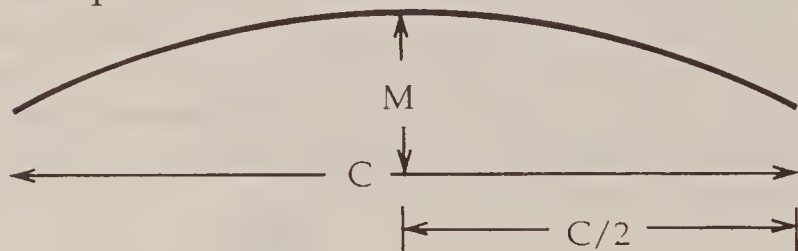
$$r = C^2/8M$$

The formula to calculate the circumference (c) is:

$$c = 2\pi r$$

$$\pi = 3.14$$

Example:



$$\begin{array}{lll} C = 7.8 \text{ cm} & r = 7.8^2/8 \text{ (1)} & c = 2 (3.14) (7.6) \\ M = 1 \text{ cm} & r = 60.8/8 & c = 2 (23.9) \\ & r = 7.6 \text{ cm} & c = 47.8 \end{array}$$

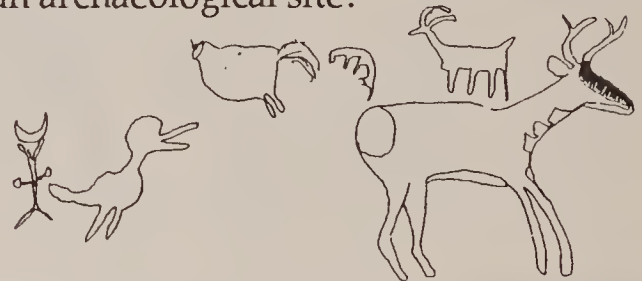
Calculate the circumference of the pots represented by each sherd on the activity sheet.

4. The relationship between chord and radius is approximate. The formula is most accurate when the chord length used is small in comparison to the radius. Below is the range of error in calculations:

C/R	Error (percent)
1/1	6.4
1/2	1.6
1/4	0.4
1/10	0.1

5. Ask the students:

- Describe the different shapes and sizes of pottery vessels in your kitchen. Write their descriptions or draw pictures of the vessels on the board.
- Are vessels of different shapes used for different purposes or occasions? Give examples.
- Are vessels of different sizes used for different purposes or occasions? Give examples.
- How might archaeologists interpret the presence of vessels of variable sizes and shapes in an archaeological site?



Closure:

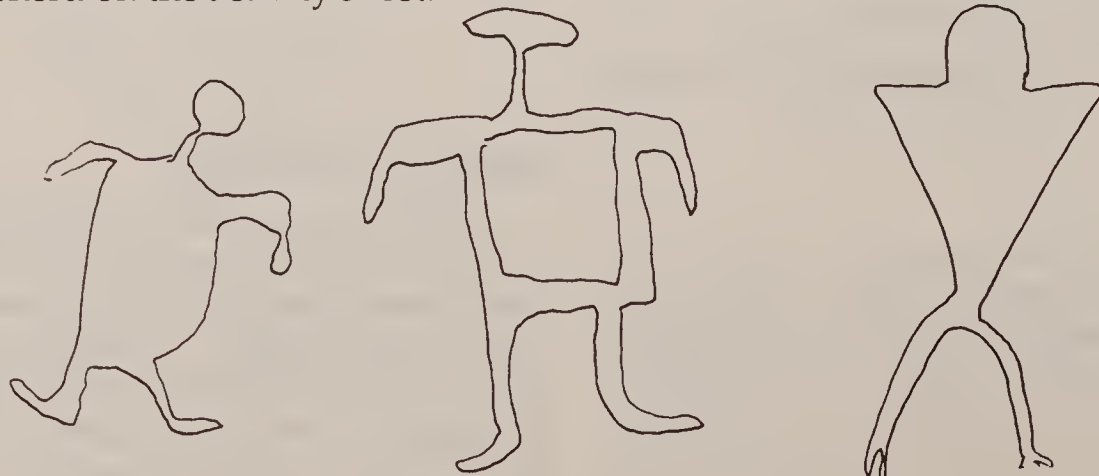
Summarize the reasons why archaeologists compute the circumference of ancient pottery vessels.

Evaluation:

Students calculate the circumference for each of the pots on the copycat page, and turn in their work for evaluation.

Broken Pots Activity Sheet Answers (approximate)

- 75.3 cm
- 15.7 cm
- 10.7 cm
- 25.1 cm

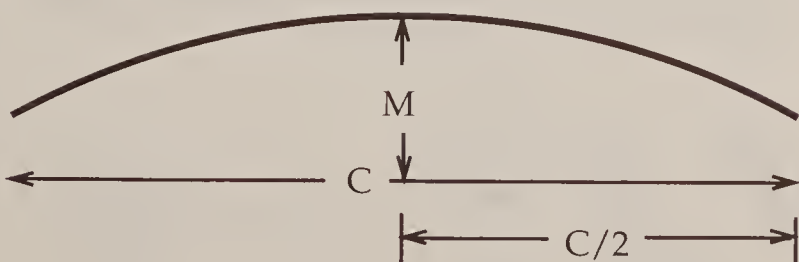




Broken Pots

Name: _____

Find the circumference of the pots represented by the sherds below.



$R = C^2 / 8M$ Circumference = $2 \pi R$



21

ARCHAEOLOGY AND ETHNOGRAPHIC ANALOGY: THE ANASAZI AND THE HOPI

SUBJECTS:	Science, social studies, language arts
SKILLS:	Analysis, synthesis, evaluation
STRATEGIES:	Role play, reading, map reading, analogy
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; work groups of 2

Objectives:

In their study of ethnographic analogy students will use an ethnography and an archaeological site map to:

1. Infer the use of ancient Anasazi artifacts based on their use among the Hopi.
2. Explain why archaeologists use ethnographic analogy.

Materials:

"Flatrock Ruin" activity sheet and the Hopi ethnography for each student or team.

Vocabulary

ethnographic analogy: inferring the use or meaning of an ancient site or artifact based on observations and accounts of its use by living people.

ethnography: description of a culture based on observation of and interaction with living people.

myth: usually a traditional story of presumably historical events that serves to unfold part of a world view of a people or explain a practice, belief, or natural phenomenon.

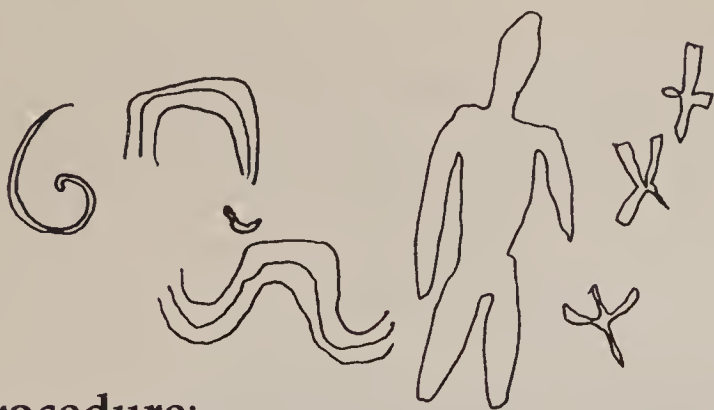


Background:

Cultural anthropologists write ethnographies or descriptions of the people that they study. An ethnography usually includes information on the kinship system, subsistence activities, religion, and many other aspects of the culture. Sometimes ethnographies tell how certain artifacts or buildings were used. Archaeologists often use ethnographic information to help them interpret how artifacts and sites might have been used by ancient people. For example, circular subterranean structures in ancient Anasazi sites are interpreted to be kivas, similar to those constructed by the modern Hopi in northern Arizona.

While ethnographic information does not provide direct proof of the function of archaeological materials, it offers invaluable assistance in determining how certain artifacts and structures may have been used by their makers. If an archaeologist is studying sites in the Great Basin portion of Utah, he or she could use ethnographic information about the Numic peoples who lived there at the time of Euro-American contact and were studied by anthropologists. Knowing how the people lived in this area could help in interpreting the archaeological sites located in the same area.

Archaeologists also use historic photographs of people to find clues about the uses of artifacts and features. In addition, many historic travelers such as John Wesley Powell recorded their observations of native life before it was changed by contact with Euro-American cultures. These observations also provide important clues to archaeologists in interpreting artifacts and archaeological sites.



Procedure:

1. Give copies of the activity sheet to each student/team and have them imagine they are archaeologists studying the site represented by the map.

2. Have the students read the ethnography. The students/teams now fill in the activity sheet using the information in the ethnography. For example, to determine how the Hopi used a kiva, they locate where kivas are discussed and write the interpretation in the blank.

3. Ask the students: What were you able to learn about the archaeological site using the ethnography of the Hopi? Were you able to find out how the Anasazi inhabitants must have met some of their basic needs? Which ones? (food—piki bread, corn; explanation—kiva, sipapu, kachinas, the sacredness of corn)

Closure:

Why do archaeologists use ethnographic information to help interpret archaeological sites?

Evaluation:

The students turn in their activity sheets for evaluation.

Links:

Section One, Lesson 3: "Observation and Inference"

Section Two, Lesson 13: "The Anasazi People"

References:

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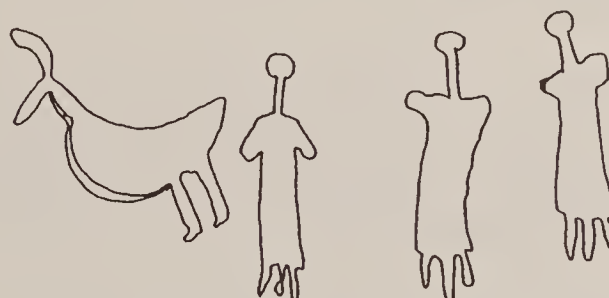
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Smith, Watson, 1952, *Kiva Mural Decorations at Awatovi and Kawaika-a, with a Survey of Other Wall Paintings in the Pueblo Southwest*. Papers of the Peabody Museum of American Archaeology and Ethnology, Vol 37. Harvard University Press, Cambridge, MA.

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Flatrock Ruin Activity Sheet Answers

1. A round ceremonial structure
2. May symbolize where the first people came onto the earth.
3. Used for cooking, probably piki bread
4. Used to make piki bread
5. Corn is sacred, it may have been used in a ceremony.
6. A very sacred object to the Hopi.
7. They probably made piki bread to eat. Their religion may have been similar to that of the Hopi.



THE HOPI OF NORTHERN ARIZONA

Hopi—Descendants of the Anasazi

The Hopi people of Northern Arizona recognize themselves as descendants of the Anasazi Indians. "Hopi" means "peaceful people." The Anasazi lived in the Four-corners region from about 1500 to 700 years ago when they abandoned their cliff dwelling homes and moved southward to the Rio Grande River drainage and the Hopi Mesas. We are not sure why they moved.

Modern Hopi people have many of the same cultural characteristics that archaeologists have recorded about the Anasazi. For example, the Hopi live in adobe structures on top of mesas and build round ceremonial structures called kivas. The Anasazi made their homes out of adobe and also built kivas. The Hopi are masters of dry farming (growing food without extensive irrigation), and they cultivated corn, beans and squash. These foods were also grown by the Anasazi in much the same way.

Corn—A Way of Life for the Hopi

Corn is very sacred to the Hopi people. Traditionally, their survival depended on corn. Pollination and moisture are important for the growth of this lifeblood food, and pollen and rain are very sacred to the Hopi. They grow four different colors of corn—blue, white, yellow and red—representing the four cardinal directions. Blessings, dances and ceremonies are offered to corn, and it is eaten with almost every meal. A Hopi baby is named during a ceremony in which he or she is given their first taste of corn mush.

Hopis make a special food of corn called piki bread. It is made for all special occasions and for ceremonies. "In every house there is a little oven made of a flat stone eighteen or twenty inches square, raised four or five inches from the floor, and beneath this a little fire is built. When the oven is hot and the dough is mixed in a little vessel of pottery, the good woman plunges her hand in the mixture and rapidly smears the broad surface of the furnace rock with a thin coating of the paste. In a few moments the film of the batter is baked; when taken up it looks like a sheet of paper. This she folds and places on a tray. Having made several sheets of this bread from the batter of one color and placed them on the tray, she takes the batter of another color and, in this way makes seven sheets of each of the several colors of corn batter" (Powell, 1972, p.20).



A traditional recipe for piki bread:

1 cup green juniper ash

1 cup boiling water

3 cups water

1 cup blue cornmeal

Sunflower oil for greasing stone

Mix ash with boiling water. Strain juniper ash into a pot. Stir. Add blue cornmeal and water. Stir with a wooden spoon or stick. Let cool. Spread on hot, greased griddle or stone with palm of hand. Be certain the layer is very thin. Cook for a very short time. Carefully, lift paper-thin layer from the griddle by rolling from one end to the other, jelly roll fashion (Williamson and Railsback, 1987, pp.46-47).

Blue corn and pinyon pine nuts are two other Hopi foods. Try blue corn chips, blue popcorn, or pinyon pine nuts as examples of Hopi foods.

Hopi Kachinas

Kachinas hold great importance in the Hopi religion. "Kachina can mean three things: the spirit the Hopi believe in, a masked dancer which embodies the kachina spirit, and a carved doll, painted in the spirit's likeness. Kachinas can take many forms—ogres, animals, birds, or clowns. Mudheads are the best known Hopi clowns" (Billard, 1974, p.181):

One of the most important religious item in Hopi culture is the kachina mask. Some of these masks are very elaborate. The wearer of the symbolic mask becomes the kachina and temporarily has all of its spiritual power and character (Smith, 1952).

Hopis believe that the kachina spirits live with them for six months of the year. At the end of their stay, the kachina spirits are sent back to their home on the San Francisco Peaks with a grand ceremony called the Niman or "home" dance. "It is on these peaks where the kachinas are believed to feast on plump squash and melons and gather their ceremonial needs for six more months of the year. A Hopi with a pure heart may someday join his ancestors on the snowy peaks" (Billard, 1974, p.179).



Hopi design

A Hopi Kachina Song

"In May, corn planting time, the Kachinas wear masks painted with rainbows, and they sing a song about butterflies flying over the corn and bean fields. One butterfly is flying after another, like a hunt, and there are many butterfly pairs. Even as the Hopis paint their faces for a ceremonial dance, so have the butterflies painted themselves with pollen for their flight over the corn blossoms.

The butterflies must go through many flowers, say the Hopi, to make themselves so pretty" (Williamson and Railsback, 1987, p.47).

Korosta Kachina Song

Yellow Butterflies,
Over the Blossoming Virgin Corn,
With Pollen-Painted Faces
Chase One Another In Brilliant Throng
Blue Butterflies,
Over the Blooming Virgin Beans,
With Pollen Painted Faces
Chase One Another in Brilliant Streams.
Over the Blooming Corn,
Over the Virgin Corn,
Wild Bees Hum.
Over the Blooming Virgin Beans,
Over the Virgin Corn,
Wild Bees Hum.
Over the Field of Growing Corn,
All Day Shall Hang the Thunder Cloud;
Over Your Field of Growing Corn
All Day Shall Come the Rushing Rain.



Hopi design

Hopi Ways

John Wesley Powell, an early explorer and scientist, visited the Hopi Mesas in 1870. He observed:

In the early history of this country, before the advent of the Spaniards, these people raised cotton, and from it made their clothing; but between the years 1540 and 1600 they were supplied with sheep, and now the greater part of their clothing is made of wool, though all their priestly [clothing], their wedding and burying garments, are still made of cotton.

Men wear moccasins, leggings, shirts and blankets; the women, moccasins, with long tops, short petticoats dyed black, sometimes with a red border below, and a small blanket or shawl thrown over the body so as to pass over the right shoulder and under the left arm. A long [belt] of many bright colors is wound around the waist. The outer garment is also black. The women have beautiful, black glossy hair, which they take great pains in dressing. Early in



the morning, immediately after breakfast, if the weather is pleasant, the women all repair to the tops of the house, taking with them little vases of water, and wash, comb, and braid one another's hair. It is washed in a [mixture] of the soap plant, a species of yucca, and then allowed to dry in the open air. The married ladies have their hair braided and rolled in a knot at the back of the head, but the maidens have it parted along the middle line above, and each lock carefully braided, or twisted and rolled into a coil supported by little wooden pins so as to cover each ear, giving them a very fantastic appearance.

I have already said that the people are hospitable; they are also very polite. If you meet them out in their fields, they salute you with a greeting which seems to mean "May the birds sing happy songs in your fields." They have many other greetings for special occasions. Do one a favor and he thanks you; if a man, he says, "Kwa kwa"; if a woman, "Es-ka-li." And this leads me to say that there is a very interesting feature in their language . . . many words are exclusively used by men, others by women. "Father," as spoken by a girl, is one word; spoken by a boy it is another; and nothing is more vulgar than a man to use a woman's word, or a woman a man's (Powell, 1972, pp.21-22).

A Hopi Origin Myth

The Hopi believe that the first people lived underground and then moved up onto the earth, coming through a hole they call a sipapu (SEE-pa-pu). Both the Hopi and the Anasazi include a sipapu as part of their kiva. The sipapu is a small hole in the floor, and is always located behind the fire pit on the north side of the kiva.

The story of the Hopi myth is told by Reynold Nash, a Hopi boy:

The Hopi people came up from a hole in the ground. When they die, they go back into the hole to another world.

The first world of the Hopi Indians was a bad place. The god who made the world said he would make a second world. He told Spider Woman that she should lead the people to a second world.

She showed them the way and when they got there they started planting and building homes, but things were not good. There was a lot of killing going on and there was no game to hunt. Spider Woman went to the god and told him what was happening. He said he would make a third world and that Spider Woman would lead the people again.

In the third world there was no killing and for a while there was enough game. The people tried to plant food but the plants could not grow because there was no light or heat.

The god told Spider Woman to build bonfires around the field. The fire gave some heat and light and the people built fires every day. That way they were able to make things grow. But still that dark world was not good. People were dying. Again Spider Woman went to tell the god what was happening.

He said he would make the fourth world. It would be the last one he was going to make, he said.



The Hopi people came up into the light. They found good land to plant. They lived high up on the mesas where they were safe from their enemies, the Navajos and Utes and other tribes.

Now there are roads leading up to the thirteen Hopi villages, the same roads that used to be trails made by the first Hopis. The Hopis still have the same shrines their ancestors had.

The Hopi people have a good life. They grow their crops in peace. The men make kachina dolls out of cottonwood and the women make baskets out of yucca and pottery out of clay.

The Hopis are still in the fourth world. They thank the god and Spider Woman by taking prayer feathers to the shrines.

The Hopis enjoy staying in the fourth world. (Baylor, 1976, pp.26-28)

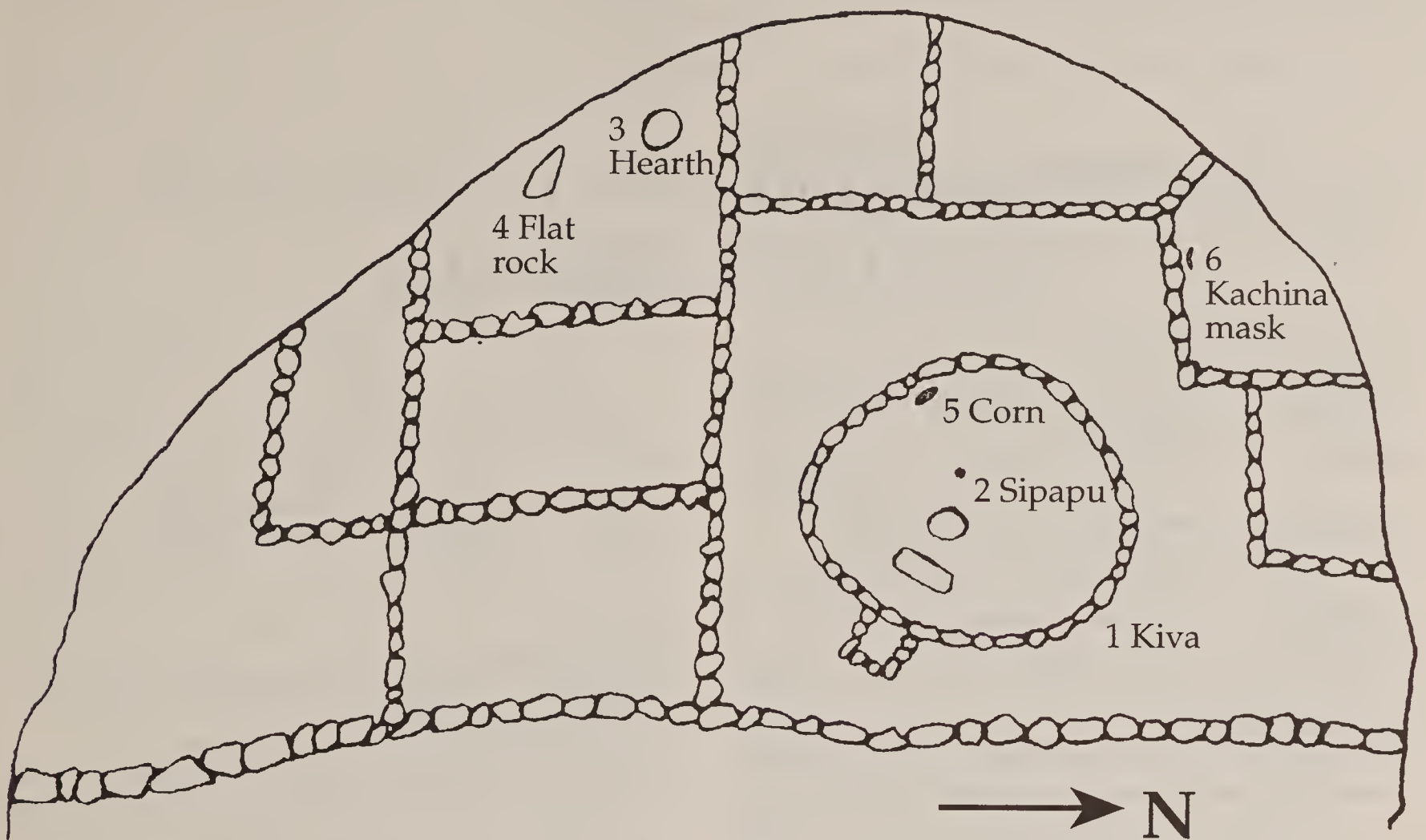
The Hopi Today

The Hopi today are exquisite potters, basketmakers, carvers, weavers, and silversmiths. Many Hopi still live by their old traditions and ways, and some have adopted the ways of modern life. These two ways of living can cause many problems for the Hopi. Some of the challenges the Hopi face today revolve around land use, energy and mineral development, and social and health problems.

If you enjoyed this story you might want to read *The Village of Blue Stone* by Stephen Trimble or *The Pueblo* by Charlotte and David Yue.



Flatrock Ruin, Kane County, Utah Name: _____



How the Hopi used it.

1. Kiva _____

2. Sipapu _____

3. Hearth _____

4. Flat rock _____

5. Corn _____

6. Kachina mask _____

7. Describe how the Anasazi lived at this site based on the artifacts present and how the Hopi use them. Think about the basic needs.



EXPERIMENTAL ARCHAEOLOGY: MAKING CORDAGE

SUBJECTS:	Science, social studies, mathematics, language arts, art
SKILLS:	Knowledge, comprehension, application, analysis, synthesis, evaluation
STRATEGIES:	Reading, discussion, computation, scientific inquiry, brainstorming, experimentation, writing, invention
DURATION:	One to two 45 minute class periods
CLASS SIZE:	Any; work groups of 4 to 5

Objectives:

In their study of experimental archaeology students will make cordage and use an activity sheet to:

1. Experience a technique and skill prehistoric peoples needed for everyday life.
2. Compute the amount of time and materials that might have been required to make cordage in prehistoric times.
3. Construct a scientific inquiry to study the contents of an archaeological site.



Materials:

One spool of hemp rope (about 1/2 inch in diameter). Milkweed or dogbane plant stocks and sagebrush or juniper bark. (If you cannot obtain these native plant fibers, cotton string, woolen yarn, or other purchased string can be used.) "Experimental Archaeology" activity sheet for each student or team.



Vocabulary

cordage: several strands of fiber twisted together; string or rope.

experimental archaeology: scientific studies designed to discover processes that produced and/or modified artifacts and structures that are found in archaeological sites.

fiber: a slender threadlike strand or string. Bast fibers are the long fibers from a plant stock.

Paiute: an Indian tribe whose traditional territory included the Great Basin of California, Nevada, Oregon, Utah, and Idaho.

replication: the act or process of reproducing artifacts, structures, and use patterns.

sinew: animal tendon prepared to use as cord or thread.

technology: the technique or means for making or doing something, often associated with tool making.

Background:

Archaeologists cannot ask prehistoric peoples how they made their tools nor can they observe the manufacture and use of artifacts. Thus they must find other means to learn about past technological systems. Experimental replication of artifacts, structures, and wear patterns is one method. Experiments provide possible interpretations and a basis for further study but do not directly prove how artifacts were used or made.

Experimental archaeologists replicate artifacts using techniques that may have been used by ancient peoples. These studies help them to better understand the processes that produced the artifacts and structures found in archaeological sites. Replication studies include the reproduction of stone tools, basketry, ceramics, and cordage. By making these artifacts using prehistoric techniques, archaeologists can address numerous questions about how people lived in the past. Examples include: How long would it take to make a projectile point? Are some raw materials better for stone tool manufacture than others? What kind of clay is the best for ceramic vessels and where can it be found? How long would it take to make a small snare?

Experimental archaeologists also study how artifacts were used in the past. They do this by using them in ways that produce wear or damage patterns similar to those observed on artifacts. For example, archaeologists have used stone tools to butcher zoo elephants that have died in order to learn how Paleo-Indians may have butchered mammoths. They examine the wear patterns resulting on stone tools as well as the cut marks on the bones of the butchered animal. The results of their studies are used to make inferences about how prehistoric peoples may have performed similar tasks.

In this lesson students will make cordage using native plant fibers. Cordage artifacts are commonly found in dry cave sites throughout the western United States and vary in size from tiny fragments to a net measuring 140 feet by 4 feet found at Hogup Cave in northwestern Utah (Aikens, 1970, p.125). Cordage was made prehistorically from a variety of materials including the bast fibers of milkweed and dogbane, yucca leaf fibers, and juniper and sagebrush bark. Human hair and animal sinew were also used. Finished cordage varied in size from 1 millimeter to several millimeters in diameter. Relative size may have been determined by the fibers selected and the intended purpose of the finished object. Experimental archaeologists produce cordage to learn how it was made, the characteristics of the finished pieces, and how much time was required to make these important artifacts.

Setting the Stage:

1. Distribute a piece of 2-ply twine about 12" long to each student. Ask them if they can determine how the twine was made.

2. The techniques that were used to make many prehistoric artifacts are unknown today. Thus, archaeologists are confronted with problems similar to what the students just experienced with the twine. To better understand how the artifacts were made

and used archaeologists must sometimes learn prehistoric manufacturing techniques, occasionally by trial and error. This is called experimental archaeology.

3. Share the Background information.

Procedure:

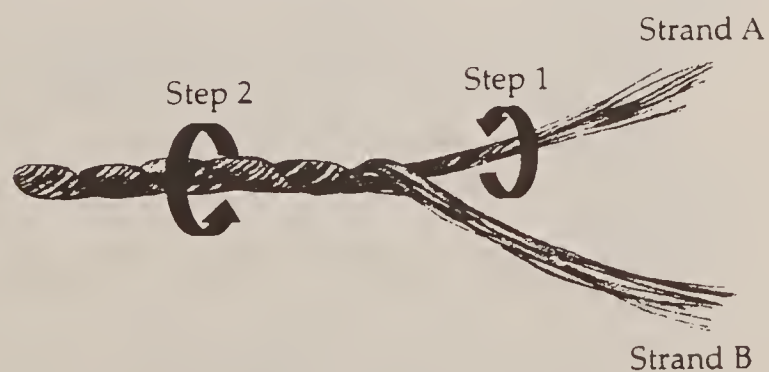
1. The students read "The Paiutes Tie Their World Together." Briefly discuss the importance of natural resources to the Paiute and their prehistoric ancestors.

2. Demonstrate how to make cordage with the commercial hemp fibers, then divide the class into groups of 4 to 5 students. Give each student about 15" of fibers. Assist each group, asking students who readily learned the procedure to help other students.

3. To prepare the fibers, cut the purchased rope into 15" sections. Untwist the rope and pull the fibers straight. If using natural fibers, cut year-old dead stalks of milkweed or dogbane. Carefully break open the stalks and strip the fiber away. Gather the loose pieces of juniper or sagebrush bark from the woody portion of the plants. The removal of small pieces will not damage the plants. Use these natural fibers in the same way as the purchased rope.

4. To make cordage, first rub the hemp, bast fibers, or bark between both palms to remove debris. Separate two long strands of several fibers each from the 15" rope or plant section, starting from one end.

5. Hold one end of Strand A and one end of Strand B together, side-by-side, in your left hand between your forefinger and thumb (if right-handed, *vice-versa* if left-handed). Pick up Strand A between your right forefinger and thumb, and twirl the strand away from your body (clockwise), Step 1 on figure.



6. Take the twisted Strand A and bring it toward your body, *over and then under* Strand B, Step 2 on figure.

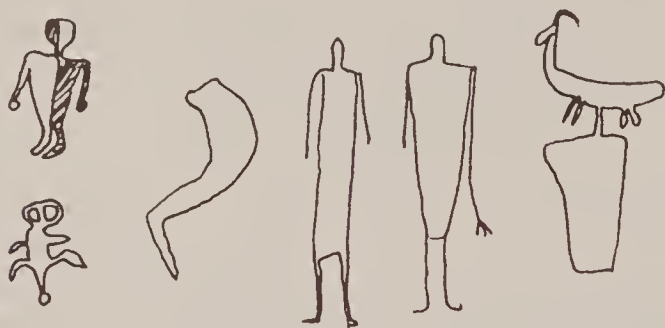
7. Hold strands A and B between your left forefinger and thumb about where you crossed A over B. Repeat the twirling and crossing sequence: pick up Strand B, twirl it away from your body, and cross it over and under Strand A.

8. Continue these steps. The twirling in one direction and crossing in another direction forms an interlocking pattern like that of machine-made rope. If the cordage looks all twisted in the same direction, then the locking twist is not taking place, and usually the strands are being twirled in the wrong direction.

9. Left-handed people will reverse the directions of twirling and crossing. They twirl the strands *toward* their bodies, and cross the strands *under then over*.

10. The process of making cordage is difficult to describe, and it sounds more complicated than it really is. Try it; it's surprisingly easy.

11. After all of the students have been successful in making cordage, use the "Experimental Archaeology" activity sheet to solve problems based on their experience. The students can work individually or in teams.



Closure:

1. Based on their experience with making cordage and the information in the reading, have the students share their impressions of what daily life of the prehistoric people might have been like. In what ways might it have been similar to their daily life? In what ways was it different?

2. Tell the students that archaeologists have excavated an archaeological site and more than 100 pieces of cordage were found in it. The cordage artifacts were classified and described as follows (write the information on the board):

Category 1

Material type: milkweed (or dogbane)
Average thickness: 3 millimeters in diameter
Average length: 105 centimeters
Number of pieces: 68

Category 2

Material type: sagebrush bark (or juniper bark)
Average thickness: 6 millimeters
Average length: 32 centimeters
Number of pieces: 35

Use scientific inquiry to study the two types of cordage.

a. Ask the question: Why is the sagebrush bark cordage thicker than the milkweed cordage? Brainstorm reasons. Sagebrush is harder to work with. The sagebrush fibers are thicker.

b. Select one **hypothesis**. For example: Milkweed fiber is stronger than sagebrush bark fiber, so it doesn't need to be as thick as sagebrush bark cordage to be as strong.

c. **Test** this hypothesis by setting up an experiment to determine the relative strengths of cordage made from the two fibers. If you did not use the natural fibers to make cordage in the classroom, you can use different types of commercial string or yarn to design an experiment. For example, test the difference between cotton string and jute string.

d. Unless the milkweed cordage is poorly made it should be stronger than the sagebrush cordage. If the experiment determines that milkweed is stronger than sagebrush bark, ask the following question: Why is there more milkweed cordage than sagebrush cordage in the archaeological site? (Milkweed may have been chosen because of its strength. Availability of the two fibers and the purpose of the artifacts may also have been determining factors.)

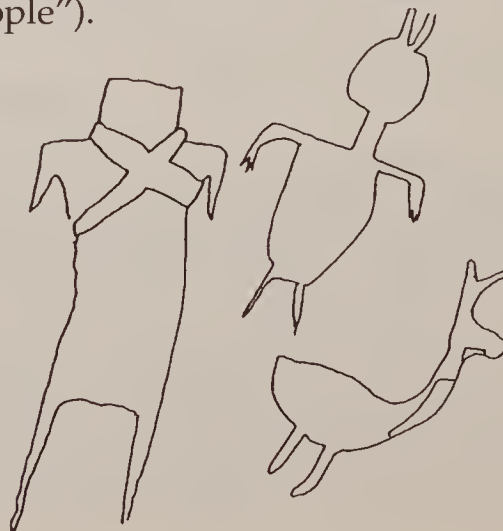
3. Summarize how and why archaeologists use experimental archaeology to study past lifeways.

Evaluations:

1. Evaluate students' efforts to make cordage.
2. Have students write a creative story, or a report, make a chart, or construct a diorama about living in the Great Basin without modern technology. They need to include five things they would have to know how to do in order to live.
3. Evaluate the students' "Experimental Archaeology" activity sheets.

Extension:

Extension 1. Discuss how technology changes culture. Suggested examples are North American Indians acquiring horses (in Lesson 14: "The Numic and Navajo People") and the cultural changes which take place when hunters and gatherers become settled farmers (in Lesson 12: "The Fremont People").



Extension 2. Demonstrate and/or display cordage in an Archaeology or Culture Fair.

Extension 3. Invent a modern use for cordage made from native plant fibers.

Links:

Section One, Lesson 6: "Classification and Attributes"

Section One, Lesson 7: "Scientific Inquiry"

Section Two, all lessons

References:

Aikens, C. Melvin, 1970, *Hogup Cave*. University of Utah Anthropological Papers No. 93. University of Utah Press, Salt Lake City, UT.

Wheat, Margaret M., 1967, *Survival Arts of the Primitive Paiute*. University of Nevada Press, Reno, NV.

Experimental Archaeology Activity Sheet Answers

1. To answer the questions follow this general process for 10 meters of cordage
 - a. Convert to centimeters
 $100\text{cm} \times 10\text{m} = 1,000\text{ cm}$
 - b. Set up the ratio
 $10/25 = X/1,000$
 - c. Solve for X
 $25X = 10,000$
 $10,000 \div 25 = 400\text{ minutes}$
 - d. Convert to hours and minutes
 $400 \div 60 = 6.6\text{ hours or }6\text{ hours }40\text{ minutes}$

1. for 100 meters of cordage
 $100\text{cm} \times 100\text{m} = 10,000\text{cm}$
 $10/25 = X/10,000$
 $25X = 100,000$
 $100,000 \div 25 = 4,000\text{ minutes}$
 $4,000 \div 60 = 66.6\text{ hours or }66\text{ hours }40\text{ minutes}$

2. for 10 meters of cordage
 $100\text{cm} \times 10\text{m} = 1,000\text{cm}$
 $7/25 = x/1,000$
 $25X = 7,000$
 $7,000 \div 25 = 280\text{ mins.}$
 $280 \div 60 = 4.6\text{ hours or }4\text{ hours }40\text{ minutes}$

2. for 100 meters of cordage
 $100\text{cm} \times 100\text{m} = 10,000\text{cm}$
 $7/25 = x/10,000$
 $25X = 70,000$
 $70,000 \div 25 = 2,800\text{ minutes}$
 $2,800 \div 60 = 46.6\text{ hours or }46\text{ hours }40\text{ minutes}$

3. conversion is not necessary

$$1/2 = x/50$$

$$2x = 50$$

$$50 \div 2 = 25\text{ stocks}$$

4. $100\text{cm} \times 2\text{m} = 200\text{cm}$

$$10/25 = x/200$$

$$25x = 2,000$$

$$2,000 \div 25 = 80\text{ minutes}$$

$$80 \div 60 = 1.3\text{ hours or }1\text{ hour }20\text{ minutes}$$

5. First compute the number of square meters in the net.

$$100\text{cm} \times 42\text{m} = 4,200\text{cm}$$

$$4200 \times 120 = 504,000\text{ sq. cm.}$$

$$504,000 \div 10,000 = 50.4\text{ sq. m.}$$

Measure the approximate length of cordage in each square meter of the net. Multiply that amount by 50.4 the number of square meters in the net. If there are 3 meters of cordage in each square meter then there are $3 \times 50.4 = 151.2$ meters of cordage in the entire net. Figuring 10 minutes per 25 centimeters of cordage, compute the amount of time required.

$$100\text{ cm} \times 151.2\text{m} = 15,120$$

$$10/25 = X/15,120$$

$$25X = 151,200$$

$$151,200 \div 25 = 6048\text{ minutes}$$

$$6048 \div 60 = 100.8\text{ hours}$$



THE PAIUTES TIE THEIR WORLD TOGETHER

Modern-day Paiutes are the descendants of people who lived in the Great Basin for the past one thousand years. The Paiutes were very skilled and well-adapted to living in the Great Basin. They used tools made only from natural materials: bone, antler, sinew and hide from animals, plant fibers, clay, and stone. They were a hunting and gathering people who knew a lot about the Great Basin's varied environments, seasons, and resources. In the fall, Paiute people gathered pine nuts in the pinyon forests of the Basin's many mountain ranges. Springs and marshes provided fish, waterfowl, game, plant food, and building materials.

The Paiutes and their ancestors had to know where to find the things that they needed and at what time of year they were available. Stone that can be made into tools is found only in certain places. Large flocks of geese and ducks live in the marshes around the Great Salt Lake for only a few weeks in the spring and fall. Many native plants that have tap roots (like carrots) are tasty and nutritious, but some are poisonous and it is difficult to tell the difference. Specific knowledge of the environment was often a matter of life and death.

The Paiutes needed many tools to live in the Great Basin, but cordage was an especially important part of their lives. "Lacking nails, bolts, and screws the Paiutes tied their world together. They tied their wood and willows in bundles to carry them into camp; they tied small game onto their waist bands; they tied tules to make boats, and cattails to make houses; they tied babies in baskets, and arrowheads to shafts. They used cords in place of buttons and safety pins, to make traps, to catch fish and hang them to dry. In addition to the tough rope of cattails and sagebrush bark, they made strong string of sinew and human hair. They also used supple young willow withes for tying. But, the finest cordage of all was made of Indian hemp, or dogbane" (Wheat, 1967, p. 55). The Paiutes used many different kinds of fibers and each was suited to a specific purpose because of its special properties. They needed to know where and when to find each type of fiber, how to prepare the fibers, and how to make useful objects from them.

Reference: Wheat, Margaret M., 1967, *Survival Arts of the Primitive Paiute*. University of Nevada Press, Reno, NV.

**Experimental Archaeology****Name:** _____

1. If it takes 10 minutes to make 25 centimeters of cordage, how long would it take to make 10 meters of cordage? 100 meters?

 2. If you increased your speed from 10 minutes per 25 centimeters to 7 minutes per 25 centimeters, how long would it take to make 10 meters of cordage? 100 meters?

 3. If it takes one milkweed stock to make 2 meters of cordage, how many stocks would it take to make 50 meters?

 4. It takes approximately 2 meters of cordage to make a snare to catch a small animal. How long would it take to make the cordage for the snare if you can make 25 centimeters in 10 minutes?

 5. A net measuring 42 meters by 120 centimeters was found at a cave in western Utah. How long do you think it took to make the net? How would you find out? (Outline the process).
-

SECTION FOUR

ISSUES IN ARCHAEOLOGY





INTRODUCTION

The lessons in this section provide opportunities for students to clarify their values concerning archaeological resources and their protection. Although some of the issues are controversial, many teachers have successfully used lessons from Section Four with their students.

Kathleen Atkinson, Midvale Elementary

*"I was hesitant to do ethical/values-type lessons with my fourth graders. I thought that these types of activities might be too sophisticated for them, but I decided to try it and see what would happen. We had completed a unit on archaeology, covering Section One and focusing on the Anasazi in Section Two. I chose to have them do **Artifact Ethics** from Section Four. I was amazed and pleased with their enthusiasm for the activity, and with the insights and conclusions they reached. They enjoyed the lesson and I think they appreciated being asked their opinions about a real issue they care about."*

Laura R. Copeland, West Lake Junior High

*About **Artifact Ethics**, Section Four . . . "I love activities where there are no right or wrong answers . . . where every answer is just about as good as the other. In that way, students think more deeply about why they chose the answer that they did--not just because it was right or wrong. Everyone becomes a winner. This lesson is adaptable to many subjects where discussion of values is involved."*

Deborah K. White, Calvin Smith Elementary

*About **Rock Art Three**, Section Four: "I like doing things that shock them [the students], rather than dancing around the subject. This is a good opportunity. The only reservation I had was that I wanted them to fully understand why we did what we did before they left for the day. Everything worked just fine."*





ARCHAEOLOGY AS A CAREER

SUBJECTS:	Science, careers
SKILLS:	Knowledge, comprehension, application, evaluation
STRATEGIES:	Reading, research, brainstorming, interviewing, writing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any

Objectives:

In their study of archaeology as a career, students will read essays and choose an activity to gain an understanding of and appreciation for the career of a professional archaeologist.

Materials:

Copies of the two essays for each student.

Background:

Archaeology is one of four sub-fields of anthropology. Anthropology is the study of humanity, in the broadest sense. **Linguistic** anthropologists study languages—how they change, how they are related to one another, and the relationship between culture and language. **Cultural** anthropologists study living groups of people. **Physical** anthropologists analyze the physical characteristics of human populations, and hominid evolution. **Archaeologists** study human cultures by analyzing material remains—artifacts and sites.

Anthropologists study human cultures and how they change. They seek to make general statements about human behavior. Anthropology addresses questions such as: In what ways does a culture change when people who were nomads become village-dwelling farmers? How does a technological invention, such as the automobile, change society? Is the passage through adolescence to adulthood less traumatic in some cultures than it is in others? Archaeology is the method anthropologists have of studying these kinds of questions through time. Archaeology is the laboratory of time, where human cultures, and how those cultures have changed, can be studied over thousands of years.



Archaeology is related to history in that both attempt to understand the past. The differences between history and archaeology center on the types of evidence used and, to some extent, the kinds of questions asked of that evidence. Historians rely mainly on written documents to study the past. They examine old courthouse records, newspapers, books, diaries, and letters, for example. Archaeologists study artifacts and sites—the things people used and the places where they used them.

Many people think that archaeologists study only ancient cultures, and that historians study only more recent events; yet historians do study the written records of the ancient Egyptians, which are over 5000 years old, and some archaeologists research the behavior of modern people by studying their garbage. In a nutshell, archaeology is a method of studying the past, even the past of 10 minutes ago, by researching material evidence—the *things* people used. History is a method of studying the past by researching written records.

In the United States, archaeologists earn degrees in Anthropology; but in some other countries, archaeology is considered to be its own discipline. A few colleges in the U.S. still offer degrees in archaeology. Most practicing archaeologists have a Bachelor of Arts degree and a Master of Arts degree. Many archaeologists also have a Ph.D. degree, a necessity for becoming a university professor. Considerations for selecting a college or university include the kinds of programs offered there, the opportunities for fieldwork and internships, and the background and research interests of the faculty. At the undergraduate level, a broad anthropological background and an archaeological field school are most important. It is often advisable to seek employment in archaeology after completing an

undergraduate degree and before beginning a graduate program. Archaeology is such a diversified field of study that a refinement of research interests will help a person select the graduate school that best meets his or her needs.

Archaeologists can specialize in a wide range of topics. Some choose to work with museum collections. Others decide to specialize in one of the analytical techniques, such as pollen analysis, identifying animal bone and plant fragments, obsidian hydration dating, or geological sediment analysis. Some archaeologists specialize in a geographical area, like Peru or the Southwestern U.S. Underwater archaeology is another speciality. Fieldwork is a component of most archaeologist's work.

Employment opportunities in archaeology are primarily with colleges and universities, state and federal agencies, and private consultant firms. Cultural resource management is a branch of archaeology that grew out of legislation requiring state and federal agencies to consider the impact that a proposed development project, such as a pipeline or road, could have on prehistoric and historic sites. Governmental agency and consultant firm archaeologists as well as universities with an archaeology contracting division frequently do work on proposed development projects. Archaeologists pursuing research topics often receive funding by writing grant proposals.

Recently, there has been a surge of interest in involving the public in archaeology. Interpretation of sites, publications written for a general audience, tours, curriculum development, and children's activities are all a part of this new specialty, "archaeo-education."

Archaeology is a study that requires a broad understanding of many things—soils, plant and animal life, geology, surveying, chemistry, computers, statistics, and the social sciences, to name a few. People with interests in many fields will find an opportunity to integrate them in archaeology. Sometimes skills learned in archaeology will lead a person to new employment opportunities and career directions in related fields. Fieldwork in remote areas and foreign countries is another aspect of archaeology that many people enjoy. Also, archaeology is a career that is inviting to women; for example, nationwide nearly half of all people receiving degrees in Anthropology are women.



Procedure:

This lesson can be used in a variety of ways. It can be a part of a careers fair or an element in a unit on archaeology. Other suggestions follow.

1. Have students research possible specialties in which an archaeologist might work. Also have them list the skills they think a person should have in order to work in that specialty.

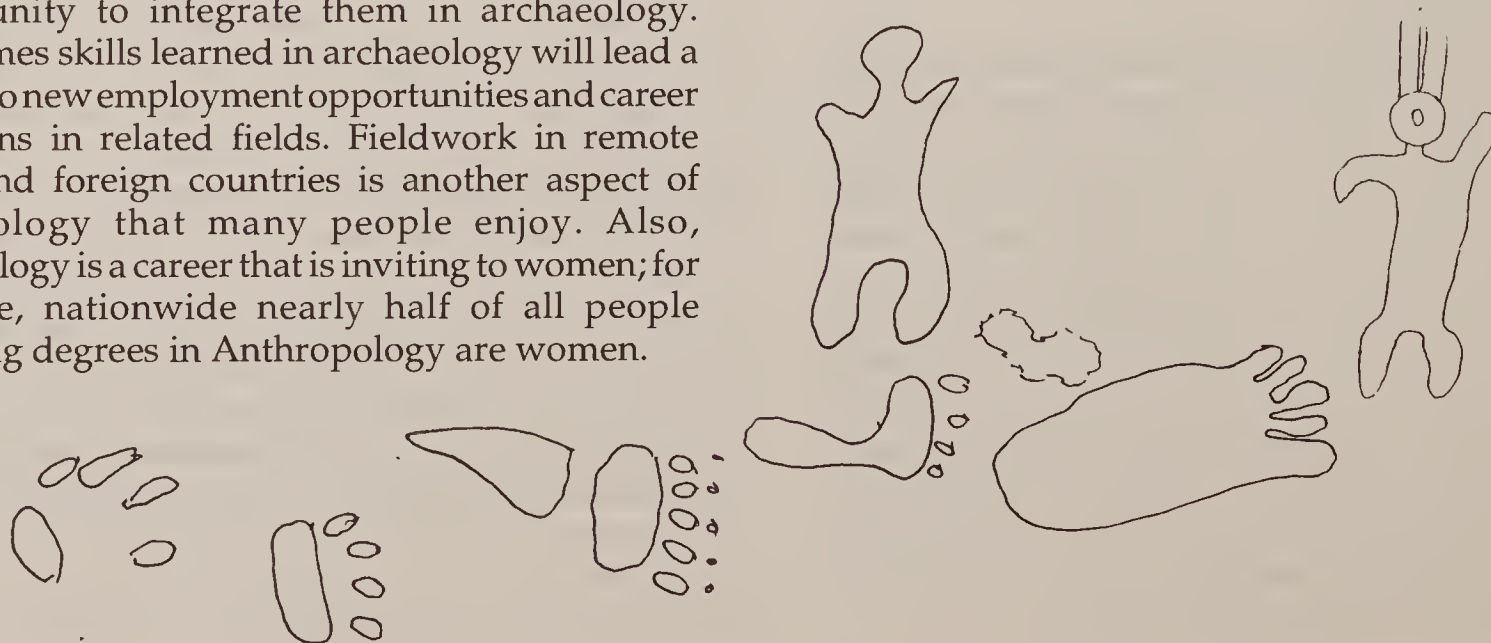
2. In small groups, students create a list of questions they would want to ask an archaeologist about his or her field. They then arrange to interview an archaeologist.

3. Students read the profiles of two Utah archaeologists and write a short essay about why they will or will not consider a career in archaeology.

4. Invite archaeologists working in a variety of specialties to speak to your class or be panel members discussing questions and issues identified by the students.

5. Ask students to think of other fields of study that relate to archaeology. Conversely, ask them how they think being an archaeologist could provide a person with background in other fields.

6. Either individually or as a small group project, students interview an archaeologist on the future of archaeology as a career.





PROFILE OF A UTAH ARCHAEOLOGIST

WINSTON HURST



Winston Hurst lives in Blanding, Utah. He does research for various archaeological companies and teaches classes at the San Juan Center of the College of Eastern Utah. He is also a paid instructor on backpacking and horsepacking trips to areas of archaeological interest. Winston was born and raised in Blanding, Utah, and he is a graduate of San Juan High School. He earned his B.A. degree in Archaeology from Brigham Young University and his M.A. Degree in Anthropology from Eastern New Mexico University.

How did you become interested in archaeology?

I was always fascinated with ancient things. By the time I was ten, my brother and I had a lab set up in a storage room and were pretending to be archaeologists. We spent a lot of time hiking around Blanding, exploring Indian ruins.

When did you decide to be an archaeologist?

In 1970, while serving in the Army during the Vietnam war, I spent a lot of time bored and reading. Some of the books were about archaeology and archaeologists. I realized then that some people really do archaeology for a living, and if they do, so could I. When I got out of the Army I enrolled in the archaeology program at BYU.

What kinds of archaeology jobs have you had?

I have worked on many surveys and excavation projects in Utah and New Mexico. For five years I was the curator at Edge of the Cedars Museum in Blanding.

**What do you enjoy about being an archaeologist?**

I enjoy having a wide range of knowledge about humankind and the natural world, and especially the Anasazi, the Utes, and the Navajos and their ancestors, as well as the history of my own ancestors. In the course of doing archaeological work, I enjoy being at times a photographer, a map maker, a soil scientist, a library researcher, a teacher, an artist and a writer. I like being paid to explore, and to study and read the land—being able to know that I'm standing in the remains of a house that was lived in 1200 years ago, or in a camp used during the late Ice Age, 10,000 years ago. I also like very much the way archaeology combines mental challenge with work in the outdoors, and being a part of the fight to save archaeological remains from being destroyed by selfish and short-sighted people.

What do you dislike about being an archaeologist?

I don't like the long hours and low pay, never having quite enough funding to do the job as well as I would like, and putting in long hours for free to make up for it. I dislike conflicts with relatives who want to destroy ruins just to find artifacts, but who don't want to learn why that is wrong.

Have you made any important discoveries?

During the 1970s I found and mapped almost 250 old Navajo and Ute sites around Blanding and added a whole new chapter to local written history that never before had been recorded. The most exciting thing for me recently has been the discovery of an ancient Anasazi road system in southeastern Utah.

What advice would you give a young person considering a career in archaeology?

Pay attention and learn everything—be like an information sponge. The great thing about archaeology is the way it combines all kinds of skills, from math to biology to art to computers to public speaking. Start early. Read a lot, and arrange to help work on archaeological projects. Do not start collecting artifacts on your own—that will not help you become an archaeologist; it will give you a bad reputation, and it is against the law.

What else would you like to tell people about archaeology?

The land is not just a big vacant lot that we can trash out and mess up without hurting anything. The land and the ancient remains on it are like a great book, the greatest of all books about the history of humanity. This book takes great patience and discipline to read, but it's worth it because it contains vast knowledge that cannot be gotten anywhere else. It is also a very fragile book, and a lot of it has already been destroyed without ever being read. More is being destroyed every day. This should give everyone a feeling of sadness and anger and a desire to help stop this destruction.





PROFILE OF A UTAH ARCHAEOLOGIST

DIANA CHRISTENSEN



Diana Christensen lives in St. George, Utah, and is the District Archaeologist for the Bureau of Land Management Arizona Strip District. Diana grew up in Bountiful, Utah, and graduated from Viewmont High School. She received an associate's degree from Ricks College, Rexburg, Idaho, and earned her B.A. and M.A. degrees in Archaeology from Brigham Young University.

How did you become interested in archaeology?

I read a book on Tutankhamen, Egypt's boy king, when I was in the sixth grade. I immediately wanted to become an Egyptologist. Over the years my interests expanded to include archaeology in general.

When did you decide to be an archaeologist?

When I was a junior in college, majoring in geology, I discovered that I loved taking archaeology classes and I really enjoyed fieldwork. I decided to follow what I really enjoyed, and changed my major to archaeology.

What kinds of archaeology jobs have you had?

I have worked for private consultant companies, a research firm, and state and federal government agencies. I have worked in Louisiana and Missouri, in Mexico and Guatemala, and all over the western United States, mostly doing survey and excavation work.

**What do you enjoy about being an archaeologist?**

The most enjoyable aspect of archaeology for me is working outside and exploring for unknown sites. Trying to figure out what people were doing at those sites is challenging and interesting, and I like that.

What do you dislike about being an archaeologist?

I dislike all of the paperwork you must keep track of and complete, such as site forms, maps, photos, and reports. However, it is necessary to leave good documentation of your work, so that others can make use of it too.

Have you made any important discoveries?

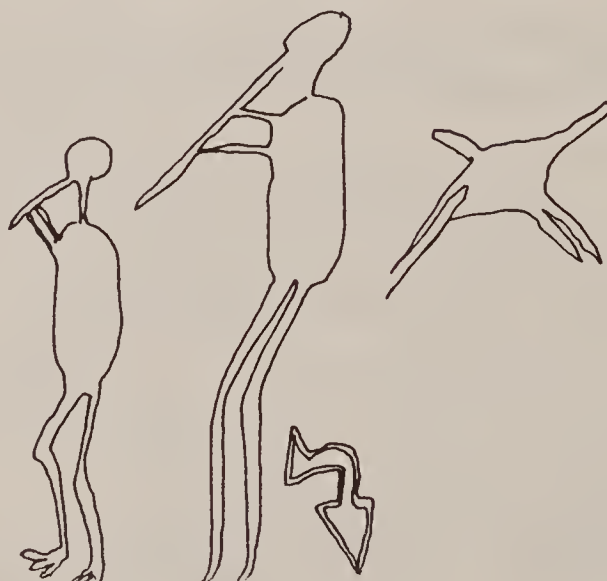
Not in the sense of making the front page of the newspaper; but in reality most of archaeology is not major "finds." It's dedicated slow work, fitting together many small pieces of information to come to an understanding about how past people lived. I feel I have contributed many of these pieces of information to our data base.

What advice would you give a young person considering a career in archaeology?

Take science, math and history courses in school. Apply for programs and opportunities you hear about in archaeology. I have found that many people don't even apply for programs because they don't think they will be accepted. Don't be one of these people—go for what you want. You may be surprised when you are accepted.

What else would you like to tell people about archaeology?

If you want to be an archaeologist, go for it! When I was studying archaeology at BYU, everyone, even my parents, advised me against it. They thought I would never get a job as an archaeologist. I am very glad that I didn't listen. I love being an archaeologist!





ROCK ART ONE : AN INTRODUCTION

SUBJECTS:	Science, social studies, language arts, art
SKILLS:	Knowledge, comprehension, analysis, evaluation
STRATEGIES:	Brainstorming, discussion, visualization, drawing, writing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any

Objectives:

In their study of rock art students will use art materials, colored photographs, and rock art examples to:

1. Differentiate between symbol, petroglyph, pictograph, and rock art.
2. Interpret rock art to illustrate its importance in the cultural heritage of a people and as a tool for learning about the past.
3. Evaluate the importance of protecting rock art for study.



Materials:

Color photos of pictographs and petroglyphs (on the covers), transparencies of "Clear Creek Canyon Rock Art Panel," clay or plaster of paris slabs (prepared ahead of time), paper, paint or marker, paper clip, "Interpretation of Clear Creek Canyon Rock Art Panel" master for each student or team.

Vocabulary

petroglyph: a design chiseled or chipped out of a rock surface.

pictograph: a design painted on a rock surface.

rock art: a general term for the pecking, incising, or painting of designs onto rock surfaces.

rock art panel: a group of pictograph and petroglyph figures.

symbol: a thing which represents something else.

Background:

Indian people throughout North America created rock art in prehistoric times. Its meaning is mysterious and at times controversial. Some people think that rock art is a type of storytelling. Others believe it depicts religious or spiritual beliefs, while still others regard it as solely an artistic expression.

North American rock art is not a true writing system which can be "read" like Egyptian hieroglyphics or a phonetic alphabet, although some rock art specialists attempt to decode rock art symbols. Archaeologists analyze rock art figures and patterns, and frequently find that different cultural groups made different styles of rock art. Other rock art researchers analyze stories and information from Indian people to draw conclusions about rock art.

Some Indian tribes have oral traditions about rock art and its meaning. Many Indian people believe that the spirit of the makers resides in what they have created. Clifford Duncan, Director of the Ute Tribal Museum and a Ute Indian, says that he feels rock art is living, that it has a spirit. Whatever our responses to, or interpretations of rock art may be, it stimulates our thoughts and imaginations and expands our awareness of cultural expressions. Rock art can mean something different to each person who ponders it. We in Utah are fortunate to have many examples of these beautiful and ancient symbols.





Setting the Stage:

1. Brainstorm examples of symbols meaningful to us today.

2. Give each student a piece of paper, a marker or paint, clay or plaster of paris slab and a paper clip. Ask them to flatten the clay into a slab and imagine that it or the plaster of paris slab and the paper are rock walls. Ask them to imagine they are living 1,000 years ago. Have them carve a symbol of their culture into the clay or plaster of paris (rock) with the paper clip. Have them paint or draw this same symbol on the paper.

3. Show the students the words "pictograph" and "petroglyph." Ask them to determine which word fits which method of rock design and give reasons for their answers. Verify the correct answer and explain that both design methods are classified as rock art. Or, give them the definitions of the root words prior to determining the correct definitions:

picto = to paint
graph = to write
petro = rock
glyph = carved work

4. Show the colored photographs of petroglyphs and pictographs found on the covers of the activity guide.

Procedure:

1. Project the "Clear Creek Canyon Rock Art Panel" transparency. Explain that this rock art panel was created by the prehistoric people of Utah.

2. Use the following questions to analyze the rock art panel:

- What words might you use to describe the symbols on this page?
- Why do you think people created these designs?
- If there is a message in these designs, what do you think it is?
- Specifically, what might the message be in the symbol labeled with a, b, c? Share the four American Indian interpretations of this symbol.

3. In what ways might rock art be important to archaeologists' study of ancient people?

4. How might vandalism to rock art create problems for the archaeologist? for the ancestors of these people? for all of us?

Closure:

In summary, why is preservation of rock art important?



Evaluation:

Instead of answering the last question as a group, require students to answer it individually in a story, poem, essay, advertisement or song.

Link:

Section Two, Lesson 12: "The Fremont People"

Clear Creek Canyon Rock Art Panel





Interpretation of Figure in Clear Creek Canyon Rock Art Panel

Levan Martineau, hired by the Paiute tribe of Utah to interpret Clear Creek Canyon rock art.

Martineau thinks this is part of a larger story of the emergence from the underworld.

- a. The clan sign of the Badger clan. Badger was involved in and recorded the emergence story.
- b. The river reed which the people of the underworld crawled through to get to this world.
- c. A god-like figure who is part of the emergence story.

Indian Joe (Joseph J. Pickyavit), Ute Indian.

Pickyavit thinks that this figure was left by the "Pueblo Indians" whom he said once lived in Clear Creek Canyon. He feels this figure deals with making rain.

- a. Rain cloud making rain.
- b. Lightning bolt making lightning with the rain storm.
- c. Medicine man with good powers in a rain sing (ceremony to bring rain).

Wil Numkena, Hopi Indian and Director, Utah Division of Indian Affairs.

Numkena thinks this figure deals with the emergence into the fourth world.

- a. Seed sack that contains the seeds used by the chipmunk to grow a plant for the people, which they used to climb out of the underworld.
- b. The Spruce or Pine tree which they climbed to get out of the third or underworld.
- c. A two-horned priest of the higher order of the priesthood and keeper of the oral traditions and the stories of the fourth world.

Kenneth Smith, Navajo Indian and early worker at Fremont Indian State Park.

Smith thinks this figure was part of a fertility ceremony.

- a. This was the sack of seeds widely planted.
- b. This was a stock of corn; corn was the most important food source for the people.
- c. This was some type of god of fertility or germination who helps the crops and plants to germinate and grow.

(Provided through the courtesy of Gordon Topham, Fremont Indian State Park.)



ROCK ART TWO: CREATING YOUR OWN

Adapted from an art activity developed by Rebecca Berru-Davis.

SUBJECTS:	Science, art
SKILLS:	Synthesis
STRATEGIES:	Visualization, drawing
DURATION:	30 to 45 minutes
CLASS SIZE:	Any

Objectives:

In their study of rock art, the students will use regional rock art symbols or their own symbols to:

1. Create a petroglyph replica.
2. Cooperatively create a "rock art panel."

Materials:

Brown construction paper, a roll of brown butcher paper, a box of cotton swabs, one cup of chlorine bleach diluted with equal amount of water, small paper or plastic cups, "Rock Art Symbols" master displayed on the overhead projector or a copy for each student.

Vocabulary

deface: spoiling or marring the surface or appearance of something.

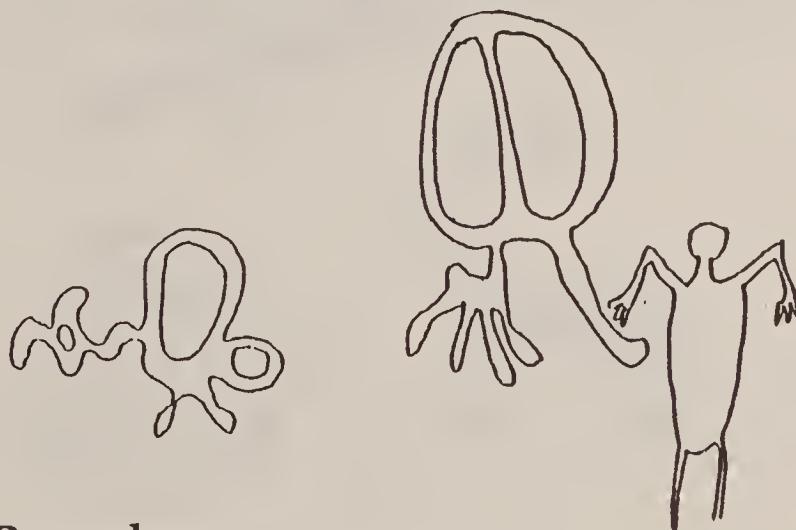
Background:

Rock art "occurs in caves, on cliff walls, or on boulders. Rock art occurs all over the world, in virtually every culture, and surviving examples are known to be as old as 30,000 years, from the time of the last Ice Age. In modern America, the most common kind of 'rock' art is that which is painted on the concrete and brick walls of the artificial canyons of our cities and on bridge abutments and rock faces along our highways. In modern American culture, as in all cultures, it expresses the values, attitudes, beliefs, and desires of the society" (Hurst and Pachak, 1989, p.1).

Setting the Stage:

1. Distribute a copy of the "Rock Art Symbols" master or display on the overhead projector. Give students time to observe and talk with each other about the symbols. **Optional:** Allow students time to imagine the meanings of the symbols.

2. Have the students close their eyes and imagine they are living in Utah 1,000 years ago. They have been traveling and have stopped in the shade of an overhanging rock to rest. While there they carve or paint figures into the rock wall. Ask students to imagine the individual symbols they draw and picture them as part of a panel.



Procedure:

1. Explain to students that they will be using symbols to make an artwork which resembles petroglyphs. They will also contribute to a "rock art panel." They may use the symbols from the "Rock Art" master for their artwork, or they may create their own symbols.

2. Give each student a piece of brown construction paper and a cotton swab. The art is created by dipping the cotton swab in bleach mixed with an equal amount of water and rubbing the wet cotton swab on the paper to form the desired design. Demonstrate the process, emphasizing to students that they must be very careful not to touch anything



but the paper with their cotton swab. Place a jar lid with a small amount of bleach in the center of the work table or carry a small cup of bleach to each student and have them dip their cotton swab. They should only need one or two dips for the activity.

3. Lay the roll of brown butcher paper on a table or floor. Divide the class into groups no larger than 10 students. An adult aide for each group would be helpful. Alternatively, have only one group at a time do the activity.

4. After students have completed their own "petroglyph" they take turns making figures on the large piece of butcher paper. Space students a few feet apart, and have small groups work at a time. Exhibit the "rock art panel" in the classroom or hallway. The panel is used for an activity in Rock Art Three.

Closure:

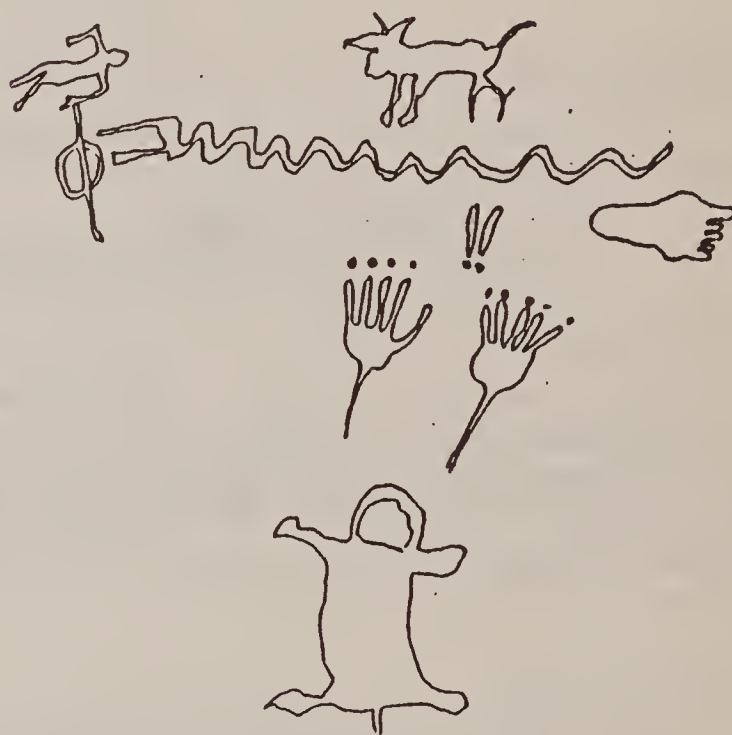
Have students share the meanings of their rock art.

References:

Castleton, Kenneth B., 1979, *Petroglyphs and Pictographs of Utah. Volume Two: The South, Central, West, and Northwest*. Utah Museum of Natural History, Salt Lake City, UT.

Hurst, Winston B., and Joe Pachak, 1989, *Spirit Windows: Native American Rock Art of Southeastern Utah*. Edge of the Cedars Museum. Blanding, UT.

Schaafsma, Polly, 1971, *The Rock Art of Utah*. Papers of the Peabody Museum of Archaeology and Ethnology Vol. 65. Harvard University, Cambridge, MA.



Rock Art Symbols





ROCK ART THREE: PROTECTING OUR PAST

SUBJECTS:	Social studies, language arts
SKILLS:	Analysis, synthesis, evaluation
STRATEGIES:	Observation, discussion, values clarification, brainstorming, decision making, problem solving, writing, drawing, invention, communication
DURATION:	One to three 45 minute periods
CLASS SIZE:	Any; work groups of 3 to 4

Objectives:

In their study of rock art, students will use a replica of a vandalized rock art panel to:

1. Examine their feelings about rock art vandalism.
2. Discuss ways to protect rock art and other archaeological sites.
3. Evaluate the Archaeological Resources Protection Act.
4. Develop an educational campaign.

Materials:

"Rock Art Panel" from Lesson 24: "Rock Art Two: Creating Your Own;" photograph of vandalized rock art; copies of the "Federal and State Laws Protecting Archaeological Resources" and "Protecting Rock Art" masters for each student or team.



Vocabulary

vandalism: willfully or maliciously defacing or destroying public or private property.



Background:

Utah is fortunate to have many fine examples of rock art, and a rich archaeological heritage. Few places in the world can boast such a long and well-preserved archaeological record as does Utah. Our past, however, is threatened by people who collect artifacts and dig sites as well as by those who vandalize rock art panels.

Collecting artifacts, digging sites, and defacing rock art and ruins has several harmful results. First of all, it destroys data, the evidence of people who lived here before us. Sites are very fragile, and one person with a shovel and ten minutes of time can destroy hundreds of years of prehistory. We and the generations of tomorrow are being robbed of the chance to learn of Utah's past.

Secondly, disturbing and vandalizing sites attacks the cultural heritage of Native Americans. These sites are the burial grounds, homes and sacred places of their ancestors. Archaeological sites can represent part of their spiritual and cultural legacy. To destroy or deface these places can be the equivalent to someone vandalizing your home, church, and cemetery.

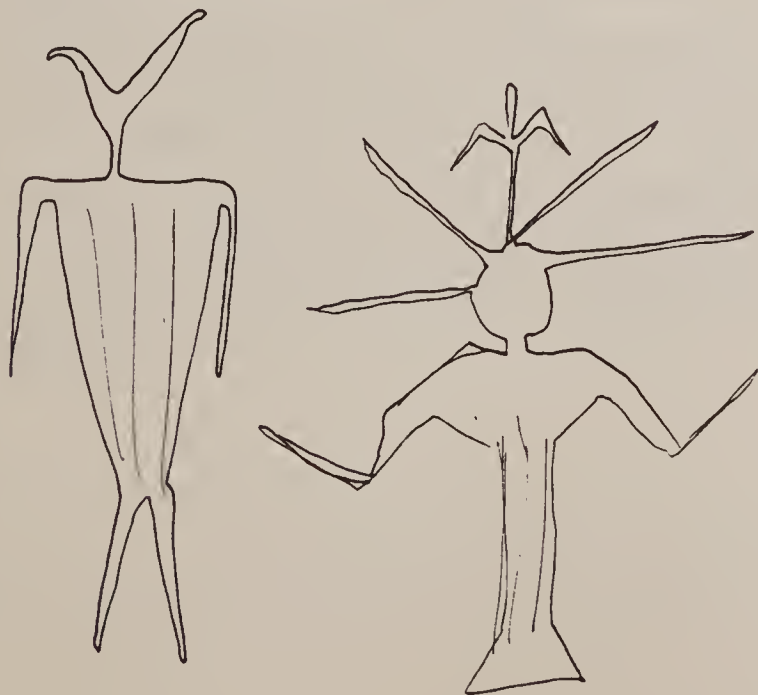
Finally, people who vandalize and destroy sites steal from all of us the opportunity to appreciate and understand other cultures. We have a great deal in common with the people who have been Utah's citizens over the past 12,000 years. It is a personally enriching experience to gain a perspective on one's life and time by understanding how and where we fit in the human history of this land.

Setting the Stage:

1. The purpose of the first part of this activity is to cause students to react to their "rock art panel" being defaced or threatened. The teacher will have to decide the best approach for his or her class. If the students are mature and if they will not think that school is an unsafe place, then the teacher anonymously defaces the "rock art panel" by painting words over it. Say nothing to the students, but when they begin to talk about it, start the activity. Alternatively, bring the rock art panel into the classroom and, holding a can of spray paint, ask "How would you feel if I were to write my name over the rock art panel you all created? Would that harm it?" Connect their feelings about their rock art being damaged to how Native Americans, archaeologists, and the public can feel when they see vandalized sites.

2. Show students the photo of defaced pictographs, which are located southwest of Price, Utah. Ask them how they feel about the vandalism that has been done to these ancient and irreplaceable rock art panels, and what they think should be done about it. It is important to move students beyond the "witchhunt," that is, trying to discover and punish the person who did the damage. Ask students to think of solutions for repairing the damage and preventing vandalism from happening in the future.

3. Distribute "Protecting Rock Art." Have the students read this page in preparation for creating an educational campaign.



Procedure:

1. Inform the students about the problem Utah is having with people vandalizing archaeological sites, including rock art panels, ruins, cave sites, and historic buildings. Explain that vandalism includes a whole range of behavior, from picking up arrowheads to mining sites with a bulldozer.

2. Ask students to brainstorm: What are the harmful results of vandalism? They can brainstorm in the following categories: destruction of data, destruction of cultural heritage, destruction of historical appreciation, or they can be given the categories for categorizing after they have brainstormed. (See "Background" for ideas to add to students' list.)

3. Distribute or project "Federal and State Laws Protecting Archaeological Resources." Review the ARPA and its penalties, and the state laws that protect archaeological resources.

4. Assist students in creating a pamphlet, brochure, poster, advertisement, etc. that will communicate to others the importance of protecting archaeological resources. They should include a description of the ARPA, and might also include some of the ideas from "Protecting Rock Art."

Closure:

Students' products could be shared at visitor centers, libraries, PTA, a teacher convention booth or a school archaeology fair.

Evaluation:

Evaluate the students' products.

Extension:

Ask students if they would like to propose an improvement to the ARPA. As a class project, have students prepare their ideal law to protect archaeological sites.

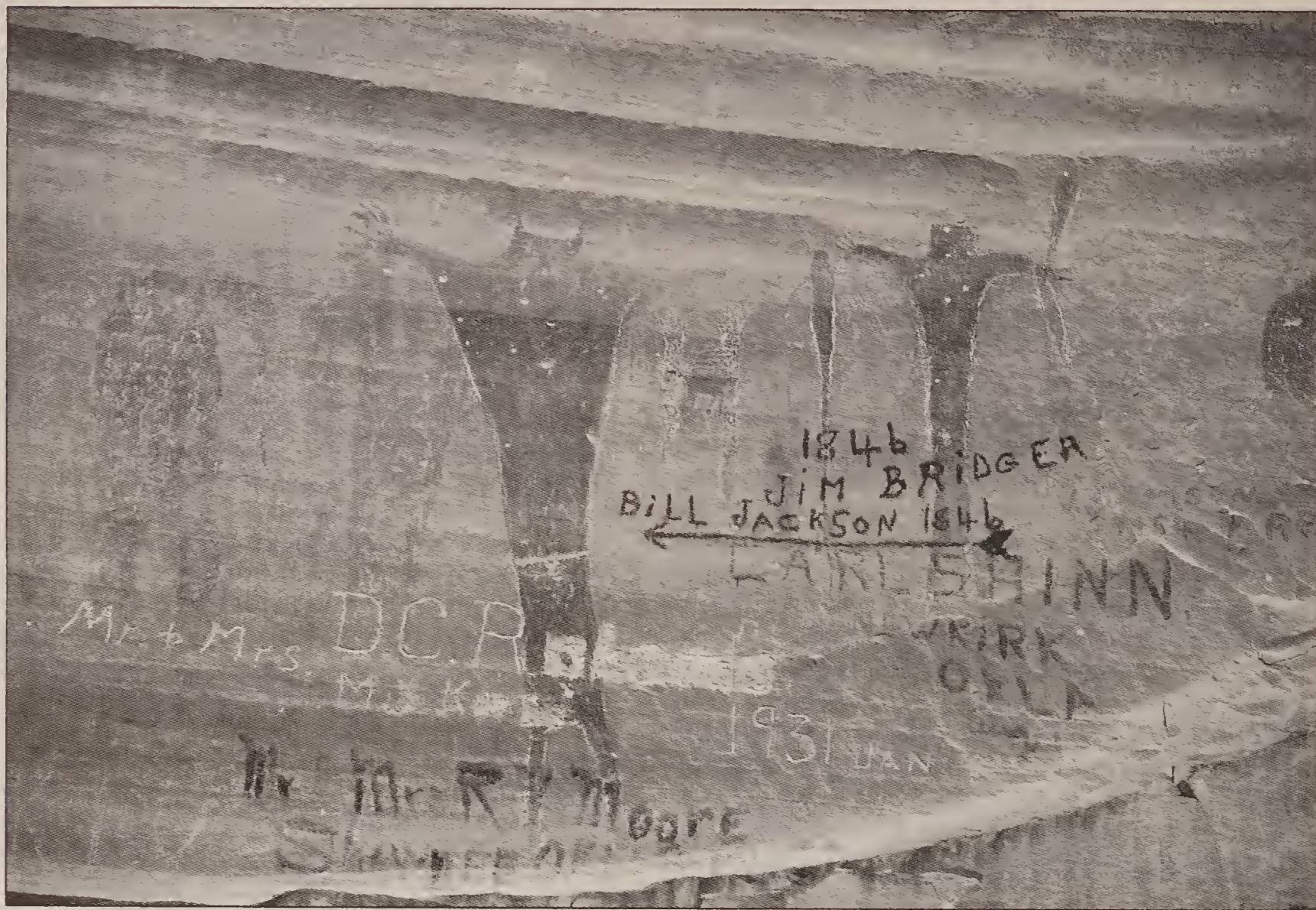
Links:

Section Four, Lesson 28: "Artifact Ethics"

Section Four, Lesson 34: "Take Action—Save the Past"



Photograph of Vandalized Rock Art Panel



Vandalized rock art, Buckhorn Wash, Emery County, Utah. Photograph by Stephen F. Poreda.



FEDERAL AND STATE LAWS PROTECTING ARCHAEOLOGICAL RESOURCES

Federal and state laws provide for severe penalties to those who disturb and destroy sites more than 100 years old. The Archaeological Resources Protection Act (ARPA) was passed in 1979, and prohibits unauthorized digging and collecting of archaeological resources, including pottery, basketry, bottles, sites with coins or arrowheads, tools, structures, pithouses, rock art, graves and human skeletons. No person may sell or buy any archaeological resource which was illegally acquired. Penalties for those convicted of violating ARPA are:

1. **First Offense:** a person who breaks this law for the first time may be fined \$100,000 and spend one year in jail. If the cost of repairing the damage exceeds \$500, the offender may receive a fine of \$250,000 and spend two years in jail.

2. **Second Offense:** a person who breaks this law for the second time may be fined \$250,000 and spend five years in jail.

3. Vehicles and other equipment used in breaking this law may be confiscated.

ARPA provides for REWARDS to people who supply information leading to the arrest and conviction of ARPA violators.

ARPA applies to all public lands, including those administered by the U.S. Forest Service, Bureau of Land Management, the military, Fish and Wildlife Service, and the Park Service.

Statutes similar to ARPA were passed in Utah in 1990, and apply to all state lands. Additionally, on private lands state law requires the express permission of the landowner before digging archaeological sites. This means that people digging on private land can be convicted if the landowner has not explicitly given permission. State law also states that it is a felony to disturb a human burial, even one accidentally unearthed at an archaeological site (archaeologists excavating with authorization are exempt.)

Some people digging in sites are engaged in an illegal market activity, are armed with weapons, and should be considered dangerous. Never approach someone you see digging in sites or collecting artifacts. Instead, record information about them—their physical description, what they were seen doing, the license number of their vehicle—and immediately report them to a local law enforcement agency.

People recreating in the out-of-doors occasionally find archaeological sites, and wonder what they should do. Always leave artifacts where they are found. Discoveries of rare or remarkable artifacts and sites should be reported to the land managing agency, or, in the case of private lands, to a local agency archaeologist or the Utah Division of State History.



Protecting The Past: Things Not To Do

1. **Touching** rock art with your hand can damage it.
2. **Making paper rubbings or tracings** may damage the rock art.
3. **Making latex molds** of rock art can damage the rock art and should only be done by professionals if the rock art is going to be destroyed by construction or development.
4. **Building fires nearby** can cause serious damage from smoke and high temperature.
5. **Taking it home.** Some selfish people have taken it upon themselves to steal rock art by using rock saws and chisels.
6. **Chalking** is harmful to the rock art, and makes it impossible to use new methods of dating the figures.
7. **Re-pecking or re-painting** a difficult-to-see image doesn't restore it, but rather destroys the original; there is no such thing as "restoration" of rock art.
8. **Defacement.** Short-sighted, selfish, insensitive people often paint their names over rock art, or shoot bullets at it. All forms of defacement are signs of disrespect for other cultures.
9. **Tunnel vision.** People like rock art so much, they often forget to watch where they are walking and may trample or damage important artifacts.
10. **Removal or rearrangement of artifacts** destroys archaeological data. Artifacts should be left where they are found. While it is okay to pick up and look at most artifacts, you should not make piles of artifacts at the site or take them home.
11. **Disturbance of the ground.** Any digging at an archaeological site is not allowed. Even too many visitors walking around may damage an archaeological site. Visitors should tread as lightly as possible, especially on loose slopes and under rock overhangs. Driving off of designated roads may also damage archaeological sites.

(Excerpted from Hurst and Pachak, 1989, pp. 25-26).



ROCK ART FOUR: CREATIVE EXPRESSION

SUBJECTS:	Art
SKILLS:	Synthesis
STRATEGIES:	Decision making, sculpting
DURATION:	Depends on chosen media
CLASS SIZE:	Any

Objectives:

In their study of rock art, students will use ancient rock art as inspiration for their own artistic expression.

Materials:

Rock art reference books, clay, paper maché materials or other three dimensional media.

Background:

Observing the shapes, designs and textures of rock art transports us back in time. We wonder—who were the creators, what was their world like, why did they create images on rock, what are their meanings?

Joe Pachak, a Utah artist, seeks to come in contact with the creative spirit of the rock art artists through his art work. He uses original rock art designs as inspiration for three-dimensional sculptures, giving the ancient designs new life through movement and action. As he works with the rock art figures he feels that he makes a connection with the creative spirit of a person from the past, getting closer to that person's ideas.

Joe Pachak's work is on display at the Edge of Cedars Museum in Blanding, Utah.

Students can experiment with this same creative technique using clay or paper maché.

Setting the Stage:

1. Have the students explore a variety of rock art images in reference books and imagine how they might transform these two-dimensional figures into three-dimensional shapes.

2. Share background information.

Procedure:

1. Have the students choose a rock art figure to create in three-dimensions.

2. Working with media such as clay or paper maché, the students will transform their rock art figure into a sculpture. Encourage them to add movement and action to their figure.

Closure:

Provide an opportunity for students to share their work, such as at an archaeology or culture fair, or in a display at a mall, in a city library, or at their school.

Evaluation:

1. Students brainstorm other ideas for transforming rock art symbols into their art work.

2. Experiment with one or more of these ideas.

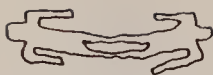
References:

Castleton, Kenneth B., 1984, *Petroglyphs and Pictographs of Utah, Volume One: The East and Northeast*. Utah Museum of Natural History, Salt Lake City, UT.

Castleton, Kenneth B., 1987, *Petroglyphs and Pictographs of Utah, Volume Two: The South, Central, West and Northwest*. Utah Museum of Natural History, Salt Lake City, UT.

Schaafsma, Polly, 1971, *The Rock Art of Utah*. Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge, MA.





ARTIFACT ETHICS

SUBJECTS:	Social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Discussion, values clarification, decision making, problem solving, communication, debate, drawing, composing, writing
DURATION:	One to three 45-minute periods
CLASS SIZE:	Any; work groups of 3 to 4

Objectives:

In their study of archaeological issues students will use ethical dilemmas to:

1. Examine their own values and beliefs about archaeological site protection.
2. Evaluate possible actions they might take regarding site and artifact protection.

Materials:

Dilemma cards.



Background:

This activity is designed to give students the opportunity to examine their own values and beliefs about protecting archaeological sites and artifacts. They also have opportunities to consider different perspectives on removing artifacts or disturbing archaeological sites. It is not the intent of this activity to prescribe "right" and "wrong" answers for the students, except in the areas where laws apply. The purpose of this activity is to provide students with an opportunity to make their own judgments about what they think would be the most responsible and appropriate actions to take in each described situation. This lesson should not be taught unless students have a background in archaeological concepts and methods.

Federal and state antiquities preservation laws state that it is illegal to collect, deface, injure, or excavate sites and artifacts older than 100 years on public land (see the ARPA laws, Lesson 26: "Rock Art Three: Protecting Our Past"). Public land includes lands administered by any state or federal agency, such as the Bureau of Land Management, Park Service, Forest Service, and the Fish and Wildlife Service. Utah State law further states that the above activities are legal on private land only with the express permission of the landowner. Archaeologists conducting approved field work are granted permits by federal and state agencies.

People recreating in the out-of-doors frequently discover an archaeological site or artifact. By law, the artifact is to be left in place, and the site left undisturbed. Discoveries of rare or remarkable artifacts and sites should be reported to the land managing agency, or, in the case of private lands, to a local agency archaeologist or the Utah Division of State History.

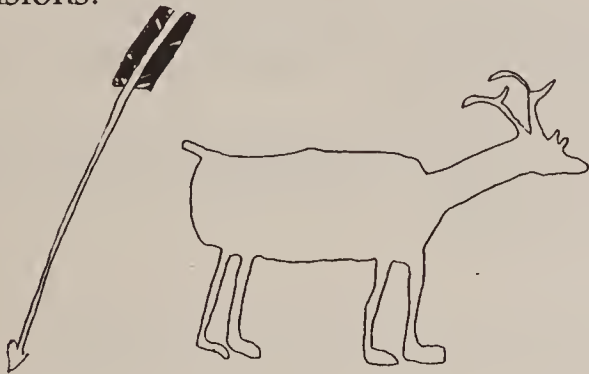
Some people collecting artifacts and excavating sites are engaged in an illegal market, are armed with weapons, and are to be considered dangerous. Students should never approach someone they see collecting artifacts or excavating sites. The best thing to do is to record information about the people—their physical description, what they were seen doing, the license number of their vehicle—and immediately report them to law enforcement. The Archaeological Resources Protection Act allows for rewards for those providing information that leads to the arrest and conviction of people disturbing sites.



Setting the Stage:

1. Ask the students: Have you ever been in a situation when you were not sure of the right way to behave or respond? For example, your best friend has his hair cut in a style you think is very unattractive. What do you tell your friend when he asks if you like the way it looks? Or, your best friend shows you a video game she has stolen from another friend's house. What do you say to your friend? Do you report the incident to someone? If so, whom?

2. Explain that the following activity will require decision making about difficult situations. As they share solutions to the following dilemmas, students should be prepared to give reasons for their decisions.

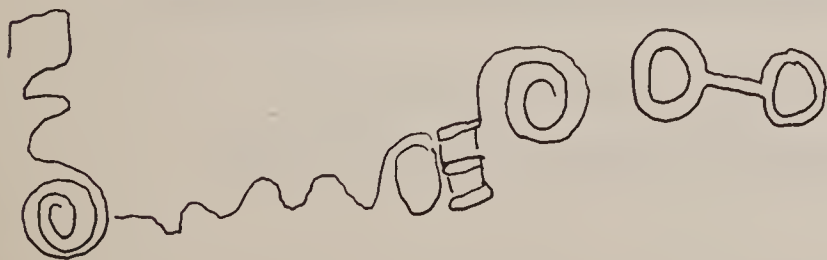


Procedure:

1. Copy the dilemma pages and glue each dilemma on an index card. Other dilemmas could be written that are more specific to problems in your area. (Students could also create Dilemma Cards, with each student responsible for one dilemma.) You may want to laminate your cards.

2. Take one of the Dilemma Cards and read it aloud to the entire class. Without group discussion, ask the class to write a paragraph or two about how they feel about the dilemma, and what they would do about it. Have them keep their papers for their own values clarification (often values change once there is group discussion and others' perspectives are introduced).

Another approach to this activity is to have the students turn in their papers (without names) and write several of their dilemma solutions on the blackboard until you have listed many strategies and viewpoints.



3. Have the students discuss the pros and cons of each solution and perhaps come to a class consensus.

This activity can help students clarify their values, while demonstrating that there are many perspectives on any issue. Ask the students to reconsider what they had originally written. Have their values changed after listening to other viewpoints?

4. Now, divide the class into groups of 4 to 5 students and give each group one of the Dilemma Cards. Have the students discuss the dilemma as a group and decide how they would solve the problem. If students create a solution they think is better than the ones listed, allow them to share this solution. Allow about 15 minutes for their discussion. Choose a spokesperson for each group to report to the class the group's decision and their reasons for taking the actions or positions they did. Were they able to all agree on what they would do?

5. Ask the students if they felt they had enough information upon which to base their decisions. Ask them if their opinion changed once they heard different points of view.

Closure:

Ask the students to share their overall position concerning the protection of archaeological resources. Or, ask them to create a symbol, story, poem, drawing or song that summarizes their opinion.

Evaluation:

Each student is assigned a dilemma. They write a short paragraph on the positive and negative effects of all the options listed for that dilemma, indicating what additional information, if any, is needed in order to make a responsible and informed decision. Finally, each student identifies which decision, in his or her judgment, is the most appropriate and responsible, explaining his or her reasoning.

Extensions:

Extension 1. Divide the students into groups as above, but this time give each group the same dilemma. Discuss the ways the different groups addressed the same issue.

Extension 2. Use the Dilemma Cards for a debate.

Links:

Section Four, Lesson 26: "Rock Art Three: Protecting Our Past"

Section Four, Lesson 32: "Archaeology—A Conservation Issue"



Dilemma 1

You are on a camping trip in a national park with some of your friends and your family. Your parents stop the car in the parking lot to visit a famous rock art site. You and your friends are walking up to the rock art when you pass a man and a woman carrying a large bag. As you continue walking, you can see the large sandstone wall covered with rock art. You look closer, and see that there is fresh red spray paint signatures covering several of the rock art figures. The paint is still dripping down the wall as you arrive. What do you do?

- Run back to the man and woman and tell them it is against the law to damage rock art.
- Do nothing, mind your own business.
- Get their license plate number, description of the car and the people, and report them immediately to the national park ranger.
- Use some of the wet paint to write your names too. After all, the settlers and Indians wrote their names and symbols on rocks.
- Call the police back home.
- Have your parents make a citizen's arrest of the man and the woman.
- Other.

Dilemma 2

You are on a scouting trip to a national forest to visit an old historic ghost town. Your scout leader takes you into an old building where there are a lot of relics laying around including bits and pieces of pottery. Your teacher has informed you that historic places are protected by the law and that you should take nothing but photographs and leave nothing but footprints. As you are leaving, you notice that your scout leader is picking up several pieces of pottery and some of the other artifacts. Several of the scouts are doing the same thing. When you tell the leader what your teacher said about not taking artifacts, the leader answers by saying, "Taking little things like broken pottery doesn't count." What do you do?

- Act as though you saw nothing, let them take the pottery pieces home.
 - Pick up just one piece of pottery as a souvenir.
 - Do nothing, knowing that you were obeying the law by not taking anything.
 - Find another scout troop.
 - Ask your parents to report the scout leader to the Forest Service.
 - Ask a professional archaeologist to come and talk to your scout troop.
 - Other.
-



Dilemma 3

You are a judge in a case where a man has been charged with pothunting and selling Anasazi artifacts through an illegal market. He has been unemployed and is using the money to buy food for his family. What do you do?

- Put him in prison for nine months.
- Fine him \$5,000.
- Release him with a warning.
- Inform him that there are social services to help him support his family, so that he does not have to destroy the irreplaceable past. Also fine him.
- Sentence him to 100 hours of community service, requiring him to give talks to schools about the importance of protecting archaeological sites.
- Other.

Dilemma 4

You are an archaeologist excavating sites in an area that is going to be the site of a hazardous waste incinerator. Your excavation team has just started uncovering what appears to be a large American Indian burial site. You know that local Indian tribes would be upset to learn that the graves of their ancestors are being disturbed. They may want to halt or attempt to delay construction of the incinerator. What do you and your team do?

- Decide to break the law and continue to dig the site. Then wait until the site is excavated to tell the Indian tribes about the burials.
- Stop excavating immediately and report the site to the local tribes.
- Continue excavating but ignore the burials and don't record them.
- Stop the excavation and recommend that the site somehow be preserved.
- Resign so you won't have to get involved.
- Other.



Dilemma 5

You are an amateur archaeologist aware that the reservoir from construction of a large dam will eventually cover an entire canyon containing many Fremont Indian sites. One of your friends asks you if you want to go to the canyon and retrieve just a few artifacts because, after all, if you don't, the artifacts will just be buried under water. What do you do?

- Go and get just one or two artifacts in the canyon. Maybe the law does not apply to areas that are going to be destroyed anyway.
- Don't go with your friend, and if your friend goes, anonymously report him/her to the law.
- Refuse to go and tell your friend that it is against the law.
- Let him or her go and get a few things for you.
- Organize a local group of amateur archaeologists to work with professional archaeologists so that more information can be recovered before the reservoir is flooded.
- Other.

Dilemma 6

You are a county sheriff and live in a small town. You suspect several people are pothunting on Federal land and are illegally selling artifacts. These people claim that they found the artifacts on their own property, and that it is legal to sell them. What do you do?

- Try to follow these people and catch them in the act.
 - Call in federal agents from another town to investigate these people, because many of them are your neighbors.
 - Don't do anything unless you catch them in the act because it is your hunch against their word.
 - Try and get them involved in amateur archaeology organizations and classes so they will understand the importance of preserving sites on private and public lands.
 - Other.
-



Dilemma 7

You are hiking in a remote section of a BLM wilderness area and discover a large Anasazi pot that is wedged in between two rocks. What do you do?

- Try to remove the pot and take it back to the BLM office.
- Leave the pot where you found it, photograph it, carefully record on a map where you found it and turn your information over to BLM.
- Leave the pot there and don't tell anyone about it or its location.
- Remove the pot, hide it in your car and take it home.
- Other.

Dilemma 8

You are visiting a state park which is a historic ranch site with several rock buildings partially intact. There is a large sign by the ruins saying: "These walls are very fragile! Do not take anything, and do not walk on, or go into the ruins." You are eating your lunch when a family arrives and ignores the sign. Kids are walking on top of the ruins and are picking up glass fragments and old nails and putting them in their pockets. What do you do?

- Ask the family politely if they have read the sign.
- Ignore them; it is really none of your business.
- Tell them they are breaking the law.
- Say nothing and try to hike out first, to find a ranger and report them.
- Other.



THE ROAD SHOWDOWN

SUBJECTS:	Science, social studies, language arts
SKILLS:	Analysis, synthesis, evaluation
STRATEGIES:	Debate, role play, values clarification, decision making, writing, visualization, communication, problem solving
DURATION:	One to two 45-minute periods
CLASS SIZE:	Any; groups of 3 to 4

Objectives:

In their study of archaeological issues students will use a role play to:

1. Debate the viewpoint of four different interest groups regarding an archaeological site and a road construction project.
2. Formulate their own decision about the proper course of action.

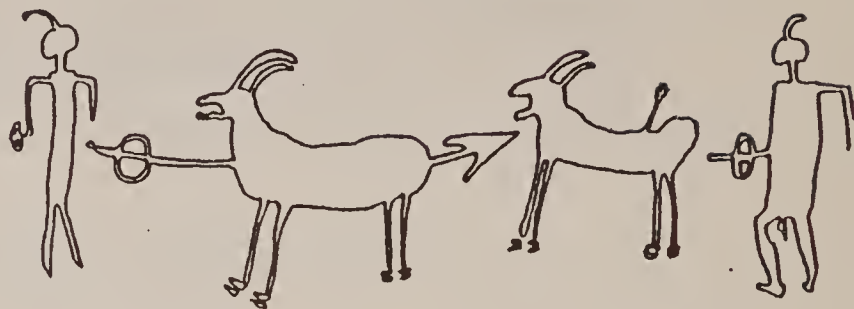
Materials:

Copies of "The Road Showdown" master for each student.

Background:

Many people care about the past, and for many different reasons. Sites and artifacts can provide meaning on several levels. Using the example of Stonehenge in England, we can list some values people hold toward the past. Archaeologists value Stonehenge for its **scientific** potential. Many people appreciate its **aesthetic** value. Druids, even today, believe Stonehenge has **spiritual or religious** significance. In recent years, the English punk movement has held a large gathering there every year, to make **social and political** statements. The concessionaires and businesses around Stonehenge also value it for its **commercial and economic** value. To some people, Stonehenge has an **intrinsic** value, and to many Britons, it embodies **heritage** values (Chippindale, 1988; Project WILD, 1983, pp.257-258).

We can examine these meanings by placing them in one of two categories, consumptive and non-consumptive. Consumptive uses are those that "use up" or deplete the past—sites, artifacts, and the opportunity for knowing about other people and



other times. Non-consumptive uses are those which do not deplete sites, artifacts, or the knowledge base.

To some people, places and things of the past are tangible reminders of their heritage and history. If a person experiences this by observing and being near certain sites or objects they are acting in a non-consumptive way. The thing or place will be there for them to experience again, and for others to experience. On the other hand, if a person takes an arrowhead, pottery sherd or old bottle, or writes his or her name on the wall of an historic cabin or rock art panel, they are consuming the past, and removing parts of it from others' experience.

Other consumptive actions include collecting artifacts to sell or trade, and destruction by development projects, such as plowing and construction of buildings.

Non-consumptive uses include aesthetic, scientific, spiritual or religious values. Sites and artifacts, when studied where they were left by their owners, provided data and scientific insight to archaeologists.

In a gray area between non-consumptive and consumptive use is site excavation done by a qualified archaeologist. The use of the site is consumptive, in that physically the site is no longer intact. It is non-consumptive in the sense that information derived from the site is obtained by scientific excavation and becomes public knowledge.

Archaeology is a rapidly changing field. New scientific techniques are developed every year that allow us to learn more from sites and artifacts. Archaeologists have adopted the ethic of conservation, and laws concerning cultural resources also recognize that we need to conserve—to wisely use—sites. There will not be any more of them, and an archaeologist has to have a good reason to "consume" a site by excavation.



Archaeologists and managers who make decisions about projects on public lands spend considerable time and energy analyzing how sites and artifacts are to be conserved. The issues surrounding use of the past are complex and often strike at the core of personal values. Responsible citizenship means being knowledgeable about these issues and taking informed and thoughtful actions.

Setting the Stage:

People often have conflicting ideas about what is the best use of a resource; and some uses preclude others. Can the students think of some examples? Possibilities include wildlife (hunters versus wildlife watchers), rivers (dams and energy versus river running and fish habitat), and fields (farming or housing development). These same kinds of conflicts affect archaeological and historic sites and artifacts as well.

Procedure:

1. Divide the students into four groups: archaeologists, American Indians, business owners, and recreationists.

2. Distribute the "Road Showdown" master to students. Ask them to read the story through the eyes of their assigned role—to adopt the viewpoint of that interest group. They will be presenting an argument for their viewpoint to a manager who will make the final decision about the project. The manager can be the teacher, a student, or a panel of students. What should the land manager decide to do about the problem?

3. Give students 10 to 15 minutes to discuss in their groups. Each group appoints a spokesperson to present their arguments. They can propose solutions to the problem which they believe could meet the concerns of all parties, as well as their own.

4. Call the "town meeting" to order and establish two ground rules, (a) no interrupting another person, and (b) be brief and to the point with your arguments. You may also want to impose a time limit on presentations.

5. Each group presents their desired outcome to the manager(s), supporting their goal with solid reasons. General discussion and rebuttal follows.

6. Summarize the discussions by asking each group to choose one or two words which describe the value with which their group is most concerned. Examples may be science, heritage, religion, money, progress, fun.

7. Discuss how each of these values and concerns has validity, and that there is no absolute right or wrong answer to the problem. Point out that being a responsible citizen means understanding all of the viewpoints about an issue before making a decision or taking an action. Challenge the students to think of solutions to the problem that could meet everyone's concerns.

Closure:

Students abandon their assigned role and write what they would personally decide if they were the land manager, and why.

Evaluation:

Evaluate students on participation in their groups, the clarity and reasoning of their arguments, and the reasoning skill exhibited in their closure written decision.



Links:

Section Four, Lesson 28: "Artifact Ethics"

Section Four, Lesson 32: "Archaeology—A Conservation Issue"

Extension:

The scenario and interest groups could be altered to fit a local situation. Students could write about the viewpoint of each of the interest groups.

References:

Chippindale, Christopher, 1988, "Telling Tales of the Past to the Public: The Stonehenge Experience." Paper presented at the Second Annual Presenting the Past Conference, Minneapolis, MN.

Western Regional Environmental Education Council, 1983, *Project WILD Elementary Activity Guide*. Project WILD, Boulder, CO.



THE ROAD SHOWDOWN

The Utah highway department is building a road connecting your town to a new reservoir. Archaeologists are excavating a site that will then be destroyed, because it is directly in the path of the new highway. They have used up all the money that the highway department budgeted for the excavation, but the site is much larger and more complex than they could tell when they first started. They say that the site is of tremendous scientific value and could help answer many questions about Utah's past. They need \$50,000 to finish the excavations.

Last week, the archaeologists uncovered some human burials. Following the law, they stopped excavating immediately and notified the nearby Indian tribe. Tribal leaders visited the site and told the archaeologists that the site included a cemetery of their ancestors, and that it had significant religious and heritage values to the tribe. Their wishes are that the site be covered up and left in peace . . . no further excavation, no road over the site.

The local business owners are very concerned that the road will be delayed or not built at all. This affects their income significantly. If motorists aren't traveling through the town on their way to the reservoir, they won't be buying gasoline, food, or lodging.

Recreationists are also very concerned. Fishermen and women, motorboat enthusiasts and water-skiers all have been waiting for years for the chance to use the new reservoir. Some have even bought expensive new boats and fishing tackle. They will have to travel 60 extra miles, taking a dirt road, to get to the reservoir if the new highway isn't built.



GRAVE ROBBERS

SUBJECTS:	Science, social studies, language arts
SKILLS:	Analysis, synthesis, evaluation
STRATEGIES:	Reading, interview, writing, discussion, analogy, value clarification
DURATION:	60 to 90 minutes
CLASS SIZE:	Any; groups of 3 to 4

Objectives:

In their study of archaeological resource protection students will use a recent newspaper article to:

1. Design and construct an analogy to demonstrate the similarities between the robbing of modern graves and ancient graves.
2. Create a newspaper article that expresses concern about robbing ancient graves.

Materials:

Copy of newspaper article master for each student.



Background:

The desire to own and/or sell ancient Indian artifacts has been popular for many years. In their search for artifacts, people dig, backhoe and bulldoze their way through sites occupied hundreds of years ago by ancient people. Since ancient people often buried their dead with artifacts, artifact hunters dig their way into grave sites in search of jewelry, pots and other artifacts. The skeletons are removed haphazardly from their resting place and often scattered around the site or thrown away.

Physical anthropologists study human remains and help archaeologists understand prehistoric nutrition, diseases, and genetic relationships. Irreplaceable scientific information about past human populations is lost forever when ancient grave sites are looted and vandalized. Equally important, vandalism and destruction of human remains offends the living descendants of ancient people.

Grave robbing has never been considered a proper act, yet it happens in both modern cemeteries and ancient sites. Vandalism and theft in modern cemeteries and of ancient grave sites shows a lack of respect for the dead and offends the living relatives of the deceased. No one wants to see the grave of a loved one desecrated.

Setting the Stage:

1. Discuss the purpose of Memorial Day and the tradition of grave decorating. Explore people's reasons for this ritual.
2. Share the Background information with students.

Procedure:

1. Have the students read the newspaper article.
2. Ask the students to design a verbal, written or visual analogy between grave robbing from modern graves and grave robbing from ancient graves.

Closure and Evaluation:

1. Ask the students to imagine that they are newspaper reporters interviewing an archaeologist or an American Indian about the robbing of American Indian ancestral graves by people in search of artifacts to collect and sell.
2. The students write an article describing what happened, including thoughts and feelings about the incident expressed by the interviewee, as well as a statement to the general public about the laws and consequences for this offense and why they are important.

Links:

Section Four, Lesson 28: "Artifact Ethics"

Section Four, Lesson 31: "A Journey Back In Time: A Guided Imagery"

Section Four, Lesson 32: "Archaeology—A Conservation Issue"

'Ghoulish' Grave Robbers Hurt Families Of Deceased When Stealing Plot Gifts

by Stephen Hunt, *Salt Lake Tribune* Staff Writer

West Valley City—

For 2 years, flowers, stuffed animals and other decorations have been stolen from the grave of Helga Neathery's daughter. But on Monday Mrs. Neathery and her husband, Allen, caught a grave robber in the act at Valley View Memorial Park, 4400 West 4100 South. It was a woman in her 50s with a plastic garbage sack packed full of stolen booty. Before the woman fled, driving her car over several grave plots to escape, Mrs. Neathery grabbed at the sack and glimpsed items bearing her daughter's name. She also got the car license number. West Valley City police are investigating the theft. "It's a sad thing, a sick situation," Mrs. Neathery said. "We lost our daughter 2 years ago, and {thefts} happened right from the beginning.

"At first it put me in a deep depression. Now I still get upset, but I realize there are people like that," she said. "They're ghouls, they're grave robbers," said Phillip Winder, president of Valley View Memorial Park. "And they have no empathy for the victims."

Mr. Winder said grave robbing is a nationwide problem, but many cemeteries cannot afford security guards to curb it. It can also be grave robbers from legitimate visitors. "We have to tread lightly," he said. "If someone is pulling off their own flowers, we don't want to accuse them of being thieves."

Peter Richards, president of Wastach Lawn Memorial Park, 3401 South Highland Drive, said he has tried everything from 24-hour security guards to hiding alarms in flower arrangements to catch grave robbers.

"We know it's a problem, we're trying to solve it and we want the public to know we're doing our best," Mr. Richards said. He said only three or four thieves have actually ever been apprehended, but all were turned over to police for prosecution. People take home potted plants believing they will die anyway; high school boys grab flower bouquets for girlfriends; and one person was taking flowers to resell, he said.

The thieves apparently believe it is not wrong to steal from the dead," Mr. Richards said. "But they are really hurting the families of the deceased."

Kathryn Young, West Valley City, said flowers have been stolen so many times from her grandmother's grave at Wasatch Lawn Memorial Park that her family has stopped decorating the plot.

Salt Lake Tribune, May 2, 1991



A JOURNEY BACK IN TIME : A GUIDED IMAGERY

SUBJECTS:	Science, social studies, language arts, art, music
SKILLS:	Synthesis, evaluation
STRATEGIES:	Guided imagery, discussion, writing, drawing, composing
DURATION:	45 to 60 minutes
CLASS SIZE:	Any

Objectives:

In their study of archaeological resource conservation students will use guided imagery to discover and judge an alternative way to enjoy artifacts without removing them from archaeological sites.

Vocabulary

flintknapping: the technique of making stone tools from stone.

metate: a shaped stone slab used as a base upon which grains, nuts, seeds, and mineral pigments were ground with a mano.

pot sherd: a piece of broken pottery



Background:

Byrd Baylor in her book, *Everybody Needs A Rock* (1974), expresses the wonder in finding a rock and pondering its source. "Always sniff a rock. Rocks have their own smells. Some kids can tell by sniffing whether a rock came from the middle of the earth or from an ocean or from a mountain where wind and sun touched it every day for a million years." Baylor suggests an atmosphere for this experience. "When you are looking at rocks don't let mothers or fathers or sisters or brothers or even best friends talk to you. Don't let dogs bark at you or bees buzz at you. But if they do DON'T WORRY." To hold a rock in our hand that may have been created thousands of years ago sets our imagination in motion. We can transport ourselves back to the time and surroundings of its creation. We can journey with it through time, imagining what other beings might have touched it or used it. Mystery and intrigue are the forces at work in our mind and many times we want to keep this mysterious object in our possession.

This same mysterious power is held within the artifacts made by ancient people. Finding an artifact connects us with other humans in a way that books cannot. We can sense the spirit of these people and we desire to know them. What made them laugh and cry? How did they spend their day working and playing? What kind of intelligence could create useful objects solely from the gifts of nature? As our minds travel back in time and connect to the people whose objects (artifacts) we hold in our hand, we

desire to keep the object as our own. Or, we recognize the beauty of the object and realize its economic advantage as a saleable item.

It is a discipline to leave something in its place when we desire to keep it. This exercise will suggest a way for students to do this.

Setting the Stage:

Share the analogy of finding a rock from the Background. You might want to have students bring their favorite rock to school and share its significance with others.



Procedure:

1. Students should have read the Fremont or Anasazi essays from Section Two.
2. Explain that the students will be taking a journey inside their minds. The purpose of this journey is to suggest an alternative for appreciating found artifacts without taking them home. Encourage students to relax their bodies, either in their chairs or lying on the floor, and to close their eyes. You can help create the mood by turning the lights off and softly playing appropriate music.



Closure:

Have students share what they saw, experienced, felt or thought during the guided imagery in a discussion, cooperative team share, drawing, song, etc. Encourage students to suggest many ways to enjoy an artifact without removing it from a site. Examples: draw a picture of the artifact, write a poem or song, compose a story, take a photograph, bring someone else to the site to see the artifact, describe your find to someone else.

Links:

Section Two, Lessons 12: "The Fremont People"

Section Two, Lesson 13: "The Anasazi People"

References:

Baylor, Bird, 1974, *Everybody Needs A Rock*.
Atheneum, N.Y.





Guided Imagery

Imagine you are on a camping trip in southern Utah. Your camp is surrounded by splendid red rock formations of all shapes and sizes, their outlines pressing against the deep blue sky. The wind is blowing in gentle gusting breezes, as you hike along a mesa. You stoop to pick up rocks of many shapes, sizes, and colors. You wonder about the rocks' names, how they were formed, how long they have been on the earth. One of these rocks you now hold in your hand. Examining it closely, you notice its edges look broken, just like your mom's pottery vase you broke last summer. Its surface feels smooth and cool and is covered with a geometric pattern.

Suddenly, you realize you have found something special. You remember learning about the pottery of the Fremont and Anasazi Indians and about how archaeologists study these people from their artifacts. You are sure you have found a pot sherd from pottery made by one of these people. You want to keep the pottery sherd so much and you slip it into your pocket. You can feel your heart beating with excitement and you want to run back to camp to share your find. Then you stop yourself. You know artifacts are to be left where they are discovered. You sit down and you become very aware of your surroundings. You notice other pot sherds scattered here and there. You hear the gentle breeze blowing through the juniper trees. Ravens call to each other. The hot desert sun warms your back as you gaze out over the desert mesa. You remove the sherd from your pocket as your mind begins to wander back in time to the village of the Fremont or Anasazi people. You are there among the people watching them at their daily activities. In the shade of a juniper you see someone flintknapping stone tools. A small child watches intently. You hear the rhythmic sounds of corn being ground in a metate. In the shade of a storage room, a potter is skillfully creating a clay pot. Small children run about calling to each other. (Give the students 2 to 3 minutes to do their own dreaming.) The sound of a raven's call nearby brings you back to the present. You lay the pot sherd back where you found it, feeling good about your decision. Before you leave you make a sketch of the pot sherd to hang on your bedroom wall.



ARCHAEOLOGY— A CONSERVATION ISSUE

(Adapted from a lesson created by Ray Swapp—Fairview, Utah)

SUBJECTS:	Science, social studies, citizenship
SKILLS:	Analysis, synthesis, evaluation
STRATEGIES:	Analogy, discussion, decisionmaking, problem solving, communication, role play, debate, values clarification
DURATION:	Two 45-minute class periods
CLASS SIZE:	Any; groups of 3 to 5

Objectives:

In their study of archaeological resource conservation, students will work in groups, using analogies and dilemmas to:

1. Infer people's motivations for using resources.
2. Decide and justify the best way to deal with the problems of resource depletion.

Materials:

Copies of dilemmas for each group.



Background:

The ethical issues surrounding the protection of archaeological resources are similar to conservation issues in general. People often have different opinions about the value of various resources and whether or not they should be protected. Those who do agree on the value of a specific resource, e.g. African elephants, may disagree on how to protect them. The same is true of archaeological sites and artifacts.

This lesson allows students to explore their values about conservation issues and make comparisons about the value and protection of archaeological sites and artifacts.

Procedure:

1. Divide the class into three groups. Each group will pick one or two spokespersons and a scribe. Give a copy of NJOMBA to group 1, KERI ANNE to group 2 and MILLIE, JIM AND MCKENZIE to group 3.

2. Each group will read their dilemma, discuss the questions and present their conclusions to the class.

3. At the end of class, give a copy of CHAD AND ALVIN to everyone. Have them take the handouts home and hold a family discussion and/or answer the questions.

Closure:

The next day discuss CHAD AND ALVIN; or, create a panel to include Chad and his father, Alvin and his mother, one or more archaeologists and one or more artifact buyers. Using the dilemma questions, each of the panelists must prepare and present a persuasive argument for a solution to the scenario problem. The rest of the class will be the citizens of the small Utah town and will question the panelists about their solutions.

Evaluation:

Evaluate the homework assignment and the students' participation in the dilemmas.



Links:

Section Four, Lesson 28: "Artifact Ethics"

Section Four, Lesson 29: "The Road Showdown"



NJOMBA

Njomba is from Kenya, a country in Africa. He lives with his family in a remote area where the forest is interlaced with areas of large plains. Many elephants live near his home. One day his father comes home with many bullets and an AK-47 rifle, a very powerful weapon. His father had found a big bull elephant with huge tusks. It had been shot many times by another hunter, but it still had lived long enough to escape and stagger into the forest before it died near their home. Njomba's father had found the bull and taken the tusks. Later, he had traded them to the ivory trader who comes through the villages every so often. In exchange for the tusks, the ivory trader had given his father the automatic rifle and bullets. He had also made Njomba's father promise that he would only sell the tusks to him when he came through the village. The whole family was excited! Now they would be rich; they would be able to buy anything they wanted! Njomba had heard that the government had made a law against killing the elephants because their population was declining, but Njomba thought there were plenty of elephants. The elephants had been there as long as the people and he believed the elephants belonged to the people, not to the government. Njomba loved the elephants, and liked to watch them; there really were plenty of them. He kept thinking of the things they could buy from the sale of the ivory.

Questions:

1. Does Njomba's family really want to kill the elephants? Describe your thoughts or feelings about their reason for killing elephants.
2. To whom do the elephants really belong?
3. What if nobody would buy the ivory? How could this be accomplished?
4. Would it really matter if there were no wild elephants?
5. List your solutions to this problem. Be creative and imaginative.
6. Be prepared to give a two-minute summary and/or solution to the problem.



KERI ANNE

Keri Anne, age 11, lives in a small logging town in Oregon. Her father is a logger who helps cut the big Douglas fir trees and haul them to the sawmill. Some of the trees are very old and large. Her father said some of them were alive 2000 years ago. When the trees get to the sawmill, they are cut up into lumber which is then sold and shipped all over the country. Her father's company is starting to clear out a large section of old growth forest. The old growth forest has a certain ecology that has existed for thousands of years. After the company clear-cuts the old growth forest, they will plant the area with new seedling trees to make a new forest. When those trees grow up there will be a new forest there, but the ecology will be different than the old growth forest. Environmentalists have legally stopped the cutting of the old growth forest Keri Anne's father is working on because of a bird called the Spotted Owl. The Spotted Owl can only live in old growth forest; it can't live in new growth forest. When all of the old growth forest is cut down the Spotted Owl will die out and become extinct. Now, because there is no work, Keri Anne's father may lose his job. They may lose their house. Keri Anne has listened at her bedroom door while her mother and father talked about it in very serious tones. If they have to move, she will lose her friends and her school, and she loves them both. She is scared and angry at the same time. The trees have been there for thousands of years. They were there before people even came to this country. How can the government tell people they can't cut them down—because of some rare bird!

Questions:

1. Why does the company cut down the old growth forest?
 2. What is more important, a few big, old trees, or jobs for people so they can provide for their families?
 3. Does it really matter if the Spotted Owl dies out and becomes extinct? Some birds have already become extinct, and life is going along okay.
 4. The lumber is used for construction and to make paper. Are there ways to reduce the demand for lumber? List some.
 5. Who really owns the forests? Who should own the forests? Give reasons.
 6. Give your solution to the problem. Be creative and imaginative.
 7. Be prepared to give a 2-minute summary and/or solution to the problem.
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MILLIE, JIM, MCKENZIE

The year is 2095. The United States has been a province of Canada for about 100 years. It had happened very quickly. It had been hard at first, but things were quite different now. The Canadians are good to the American people; they provide money, food, and even houses on a regular basis. Millie, age 10, and Jim, age 12, live in the United States. They have a very good Canadian friend named McKenzie who is also 12 years old. One day, McKenzie brought two rings and a necklace to school. The items were very intricate and also very old. The children were very interested in the relics, and asked where he had gotten them. McKenzie said that his father was an engineer and they were digging a big pipeline through the old abandoned graveyard at the edge of town. The trench had gone through several of the graves, and his father had gathered up a few of the old relics. McKenzie's father said that some of the right kind of relics were worth money to collectors. McKenzie wanted to gather and sell enough to buy a new bike. He said that there were a lot of other graves out there that could be dug up. He invited Millie and Jim to go with him on Saturday. They could have a picnic. It would be fun! Suddenly Millie and Jim both had a strange feeling. They remembered that their great and great-great grandparents were buried in that old cemetery.

Questions:

1. Why did Millie and Jim suddenly feel funny?
2. To whom do the relics really belong?
3. Does it really matter if the graves are dug up?
4. Is there a difference between McKenzie digging up a grave, and an archaeologist digging up a grave?
5. What if nobody would buy the relics? How could this be accomplished?
6. Should the government make a law against digging up graves? Give reasons.
7. Give your solution to the problem. Be creative and imaginative.
8. Be prepared to give a two-minute summary and/or solution to the problem.



CHAD AND ALVIN

Chad lives in a small town in Utah. His family doesn't have much money. Chad only has an old, rusty second-hand bike. He dreams about having a shiny, new mountain bike. On weekends and holidays in the summer Chad's family digs into the old Indian graves that are near his town. Many of his friends also dig in the graves. If they can find really nice pots, they can sell them to a man who comes through town every so often. His father has told Chad that he has found a grave site that looks really good, and that it has never been dug into. He said that if there were some good pots in the graves, there might be enough money to buy Chad a new mountain bike! Chad was really excited and anxious to dig in the new site. Chad has a good friend named Alvin who is his same age. Alvin is an American Indian. Chad ran to tell Alvin about the possibility of getting a new mountain bike. Chad told him about the new sites his father had found. He told him about the possibility of finding some very nice pots and selling them to the buyer when he came through town. When he told him, however, Alvin acted kind of funny. Chad thought he might be jealous of the new mountain bike. Chad also knew that there was a law against digging in the graves, and that there was a ranger who would arrest you for doing it. This made Chad mad because the pots had been there when his great-great grandfather had settled the area. The pots didn't belong to anybody then, so how could they belong to the government now? Besides, there were probably thousands of them out there. He knew they would have to be careful, but he kept thinking of the new bike.

Questions:

1. Why does Chad's family dig into the graves?
 2. What is the main problem in Chad's family?
 3. To whom do the pots really belong?
 4. What if nobody would buy the pots? How could this be accomplished?
 5. Will it really matter when all of the pots are dug up and sold? Why?
 6. Aren't the pots like a vein of coal? You dig them out and sell them for money.
 7. Give your solution to the problem. Be creative and imaginative.
 8. Be prepared to give a two-minute summary and/or solution to the problem.
-



UTAH PLACE NAMES

SUBJECTS:	Social studies
SKILLS:	Knowledge, analysis, evaluation, compare/contrast
STRATEGIES:	Mapping, discussion
DURATION:	45 to 60 minutes
CLASS SIZE:	Any; work groups of 4 to 5



Objectives:

In their study of place names, students will use and label a Utah map to:

1. Discover the heritage left by Native Americans and settlers in the names of locations.
2. Differentiate the cultural values expressed in names.

Materials:

One Utah state road map for each work group, laminated if possible; copies of "Indian Place Names" and "Settler Place Names" masters for each student or group; one large Utah map; stars or paper dot markers. **Note:** maps can be obtained free of charge from the Travel Council.

Background:

"Language could not exist, history could not be written, and stories could not be told without names. Names are automatically given to things by human beings. This is our only source of communication,

for there is no other way to leave a story for posterity than by and with names" (Van Cott, 1990, p. xiii). The spirit of Utah's past people lives on today in the place names of locations. These names are derived from a variety of sources: from Indian words, which usually describe the landscape or qualities of the area, such as "milky water" and "moonlight water"; from commodities settlers produced, such as Coalville, and Carbon County; or from the influence of Spanish explorers, mountain men, the military, religious history, and more. "Over the years, features in Utah have been named and renamed as the Indian was displaced by later intruders. It was the Indians who provided the earliest names in our state. Their history has given names to Utah places, some of them anglicized and others reminding us of their ancestry and legends" (Van Cott, 1990, p. xii).



Setting the Stage:

Show students the names and origins of two towns in Utah: Parowan—Indian name meaning "marshland;" Magna—derived its name from a nearby mine. What differences, if any do they notice about the origins of the names?

Procedure:

1. Give each group of 4 to 5 students a road map and the lists of Utah Indian and settler place names. Show students how to find a particular place by looking up the name and coordinates on the map

index. For example, on some state road maps, Ibapah can be found near the intersection of coordinates F and 1.

2. Working cooperatively, students are to lightly press a star or dot onto the map next to each listed place name they find. If a listed place name is not on the map index, have students scan for it for bonus points.

3. Display a large Utah map, and ask each group to share two or three places they have found. As the students call out the names and their meanings, place a star on the map.

Closure:

As discussion points, or in quiz form, discuss the following:

Contrast and compare place names derived from the Indian culture and those derived from the settler culture. What kinds of things were each named for? What can we learn about past cultures from place names?

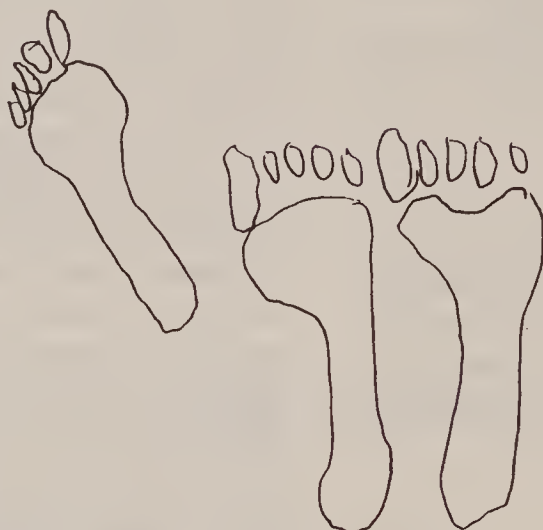


Link:

Section Two, Lesson 14: "The Numic and Navajo People"

References:

- Harrington, F.C., Florence Kerr, and Darrell J. Greenwell, 1940, *Origins of Utah Place Names*. 3rd ed. Utah Writers Project, Utah State Department of Public Instruction, Salt Lake City, UT.
- Van Cott, John W., 1990, *Utah Place Names*. The University of Utah Press, Salt Lake City, UT.





INDIAN PLACE NAMES

1. ***Utah** - "Utas," a group of the Ute people.
2. **Uintah** - (Weber) named derived from "Uinta-ats," a large subgroup of the Ute people.
3. ***Wasatch Mts.** - (Salt Lake) a Ute Indian word meaning "mountain pass."
4. **Ibapah** - (Tooele) taken from the Goshute Indian word Ai-bim-pa which means "White Clay Water" or "Milky Water."
5. **Goshute** - (Tooele) a Utah tribe, believed to mean "dust or desert people" in the Ute language.
6. ***Oquirrh - Mountains** (Tooele) "Wooded Mountain", "Cave Mountain," "West Mountain," "Shining Mountain."
7. **Parowan** - (Iron) from Paiute "paragoons" and "pah-o-an" meaning "marsh people" and "bad or harmful water."
8. **Panguitch** - (Garfield) "waters plentiful with fish."
9. **Ouray** - (Uintah) a Ute Indian leader, Peace Chief of the Ute White River Indians.
10. **Kanab** - (Kane) a Paiute word meaning "willow."
11. **Kanosh** - (Millard) a Pahvant Paiute Indian chief—"Kan" means "willow," "Oush" means "bowl."
12. **Peoa** - (Summit) Pe-oh-a, "to marry."
13. ***Mt. Timpanogos** - (Utah) from Timpanagotzis River, from the Indians living along its banks.
14. ***Oljeto** - (San Juan) (ole-Jay-toe), San Juan County; derived from a Navajo Indian word meaning "moonlight water."
15. **Washakie** - (Box Elder) named for a Shoshone leader who was friendly to the early settlers of northern Utah.

* a place not likely to be listed on road map index

(excerpted from Harrington, et al., 1940 and Van Cott, 1990)

Note: names in parentheses are the counties in which these places are located.



SETTLER PLACE NAMES

1. **Provo** - (Utah) named for Etienne Provost, a French-Canadian trapper who visited this region in the 1820's; first called Fort Utah.
2. **Richfield** - (Sevier) named for the richness of the soil; first called Omni for a Book of Mormon character.
3. **Helper** - (Carbon) named by the Denver and Rio Grande Western Railroad because at this point additional locomotives were necessary to help trains westward over Soldier Summit.
4. **Farmington** - (Davis) named as a reminder of the rich soil that encouraged a lifestyle of farming.
5. **Coalville** - (Summit) named after the coal discovery because many of the miners came from Coalville, England.
6. **Brighton** - (Salt Lake) could have been named after a city in England, or for Thomas W. Brighton or William Stuart Brighton, both of whom built homes in the area.
7. **Brigham City** - (Box Elder) named in honor of Brigham Young.
8. **Escalante** - (Garfield) named for Francisco Silvestre Velez de Escalante, a Spanish priest who explored Utah in 1776, although the route he traveled was 150 miles to the west of this town. First called Spud Valley.
9. **Fillmore** - (Millard) named in honor of Millard Fillmore, thirteenth President of the United States.
10. **Cedar City** - (Iron) named because of the abundance of cedar (juniper) trees in the area.
11. **Magna** - (Salt Lake) derived its name from a nearby mine.
12. **Ogden** - (Weber) named after Peter Skene Ogden, a trapper who worked for Hudson's Bay Company in this vicinity in the 1820s.

(excerpted from Harrington, et al., 1940 and Van Cott, 1990)

Note: Names in parentheses are the counties in which these places are located.



TAKE ACTION—SAVE THE PAST

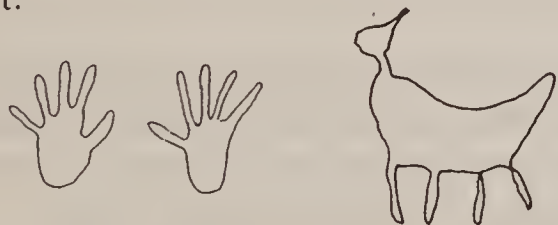
SUBJECT:	Science, social studies, language arts
SKILLS:	Application, analysis, synthesis, evaluation
STRATEGIES:	Brainstorming, decision making, planning, communication, small group work, discussion, research, writing, problem solving
DURATION:	Approximately 2 to 4 weeks, working 2 to 4 hours each week
CLASS SIZE:	Any; groups of 3 to 5, preferably 4

Objectives:

In their study of archaeological resource conservation, students will use a problem-solving model to identify a critical problem and solve it creatively.

Materials:

A copy of the "Decision Making" chart and "Review of the Problem" for each team, and a copy of Appendix 5: "Rules for Brainstorming" for each student.



Background:

The growing concern about destruction of archaeological resources (historic and prehistoric sites and artifacts) lends itself to a creative problem-solving model. Problem solving is a skill students will need for future success. Students use their creative and critical thinking skills to find useful solutions to current and future problems. When possible, students should be supported to carry out their solutions. In recent years, students across the country have been influential and instrumental in finding and implementing solutions to problems as a result of using problem-solving models. Teachers may wish to experiment with the following model. The references list books for those who want more indepth information regarding the use of problem solving.

Problem solving is most frequently done in groups of four students. It can also be done as a whole class under the guidance of the teacher.

The more this process is used, the more competent teachers and students become.

Procedure:

Step 1: Awareness

An awareness is created that a problem exists.

Step 2: Researching the Problem

Researching information about the problem is essential to problem solving. Students who have experienced many lessons from this teaching guide will have sufficient background for solving archaeological problems. These lessons together with reading the overview of the problem (below) may be adequate preparation for completing the process. Additional research may be done if the students do not feel they have enough information.

Step 3: Brainstorming Problems

Students will brainstorm a list of *specific* problems related to the overall problem of archaeological resource destruction. This will help to clarify the problem. Encourage students to list as many problems as possible (10 to 25). Examples: (1) digging up sites destroys valuable research data; (2) archaeologists cannot learn as much if artifacts are taken away or stolen from a site; (3) Indians think graves of their ancestors that are dug up have been desecrated; (4) tourists cannot enjoy and learn from sites if they have been destroyed.

Step 4: Identifying the Underlying Problem

The students now select the one problem from their list that they think is the most important; "... it should be one which, if solved, might solve many of the other problems on the list as well. It may



appear individually on the list or it may be a combination of a number of problems on the list" (Crabbe, 1988, p. 40).

The problem is most easily solved if it is stated as a question beginning with the phrase, **HOW MIGHT WE . . . ?** or **IN WHAT WAYS MIGHT WE . . . ?** and contains *one* main verb. Example: **How might we preserve** archaeological sites in Utah for enjoyment by the public during the next 100 years? **In what ways might we involve** community members in the preservation of archaeological resources?

Step 5: Brainstorming Solutions

"Once the underlying problem has been identified and written, the teams should begin their quest for solutions. This is the time for truly creative brainstorming. Students should stretch their minds as they look for actual ways to resolve the issue they have described" (Crabbe, 1988, p. 44). Refer to Appendix 5: "Rules for Brainstorming" before beginning step 5.

Step 6: Choosing and Evaluating the Best Solution

Students should read over their list of solutions and pick their 10 best solutions. From this list they will choose their best solution. This is done by establishing a set of criteria by which to judge each solution. The criteria should be stated as a question, should be problem specific, and should establish lasting effects. Examples: Which solution will have the *longest lasting* preservation effect on the archaeological sites in Utah? Which solution will be the *quickest* to implement in Utah? Which solution will be the *easiest* to implement in Utah? Which solution will *cost the least* to the Utah taxpayer? Which solution will *influence the most* people? Which solution will *involve* the most community members in the preservation of archaeological resources?

Step 7: Describing the Best Solution

In paragraph form the students describe how they will carry out their solution. They should answer the questions: Who? What? Why? Where? When? and How?

Step 8: Carrying Out the Solution

When possible provide students with an opportunity to carry out their solution. Example: If their best solution is to create an educational display for a visitor center in a national park (or other location), allow time for the creation of the display and arrange for permission to show it.



A Sample of the Process

Step 1: Awareness

Students are made aware that a problem exists.

Step 2: Researching the Topic

Students have been taught lessons from the guide, individually read the overview. Optional: conduct additional research.

Step 3: Brainstorming Problems

- Digging in sites destroys the chronology of a site.
- We as a society lose a piece of our heritage if artifacts are taken away or stolen from a site.
- Theft of grave goods injures the living descendants of ancient people.
- Etc.

Step 4: Identifying the Underlying Problem

In what ways might we *lessen* the destruction by tourists of archaeological sites in Utah?

Step 5: Brainstorming Solutions

- Create brochures about how and why to protect sites, and put the brochures in a park visitor center.
- Write a letter to the editor of a newspaper discussing the importance of protection.
- Talk about the problem of destruction on a radio talk show.
- Etc.

Step 6: Choosing and Evaluating the Best Solution

Using criteria, judge each of your solutions and then decide on your best solution. Use the decision-making sheet to help facilitate this process.

Step 7: Describing the Best Solution

In paragraph form, describe how you will carry out your solution. You should answer the questions: Who? What? Why? Where? When? and How?

Step 8: Carrying Out the Solution

Take your best solution, put it into a plan of action, and do it. (See Procedure)

References:

Crabbe, Anne B., 1988, *The Coach's Guide to the Future Problem Solving Program*. The Future Problem Solving Program, Laurinburg, NC.

Lewis, Barbara A., 1990, *The Kid's Guide To Social Action*. Free Spirit Publishing Inc., St. Paul, MN.



Review of the Problem

Out there, in the vast expanse of public lands, the American public is being plundered, robbed of a history that the land has held for thousands of years. This history has been passed down to us by the people who were here before us, including the American Indian and Euro-American settlers. They have left artifacts, drawings, and ruins of their way of life.

Some of these areas are far off the beaten path and some have been set aside as deserving special protection. In the past, only the hearty outdoors enthusiast made the difficult journey to these sites. Today, many roads and highways pierce the land, making it easier for many people to visit sites—including vandals, professional scavengers, casual collectors, and tourists.

Much damage has happened to these ancient sites. Unless we act now to save this piece of our American past, there may not be anything left to save. Large quantities of pottery, human skeletal remains, rock art, historic cabins and trails, as well as other valuable clues to our past have been damaged or removed.

Archaeologists study these ruins, drawings, and other artifacts left by the early Americans, to discover clues to past cultures. The large numbers of people visiting these sites is endangering their existence. Visitors climbing in and out of ruins damage archaeological evidence. Campers building campfires near sites can harm pictographs on walls. Wood pulled from the roofs of prehistoric and historic buildings to build campfires can cause them to collapse. Each shovelful of dirt that is pulled out of these historic sites may cause a loss of knowledge about past people. Each time a skeleton is unearthed and its bones scattered, we lose what may have been another link in our American heritage. Rock art meanings are changed beyond repair each time careless people chalk over a pictograph so it can be photographed, add their own carvings to a petroglyph for amusement or chisel a part of the art away from the wall. Each time artifacts are destroyed or removed from a site, the past culture can no longer be accurately dated and studied.

The worst thing about vandalism and destruction taking place at these historic and prehistoric sites is the finality of the situation; the loss of history is complete and can never be recovered.

The Utah Interagency Task Force on Cultural Resources is working to prevent this destruction with the help of concerned citizens. As guardian of our public lands, the Task Force agencies (Bureau of Land Management, Forest Service, National Park Service and the State of Utah) safeguard these special places.

You can help. You can learn about artifacts and their value to our culture in searching for knowledge about our forebearers. You can contact archaeological groups or historic societies in your area to find out how you can learn more. You can teach others about the importance of archaeological sites. You can form citizen groups who watch over sites. You can help prevent further destruction of these sites and become involved in legal and meaningful archaeology projects.

There are many other solutions to the problem of archaeological resource destruction. Your creative ideas are needed now!



Decision Making Sample

Directions

Follow the letters (A.B.C.D.) in completing this step. Some examples are given for you.

A Summarize your best solutions

A Summarize your best solutions		B Write your criteria in each diagonal					Total
		Which solution will have the longest lasting preservation effects on archaeological sites in Utah?	Which solution will influence the most people in Utah?	Which solution will influence the to implement in Utah?	Which solution will be the quickest to implement in Utah?		
1	Create mock sites of actual sites that tourists may visit and dig in.	5	1				6
2	Create a TV advertisement teaching people about site preservation	4	5				9
3	Write letters to the editor for local newspapers	1	3				4
4		2	4				6
5		3	2				5

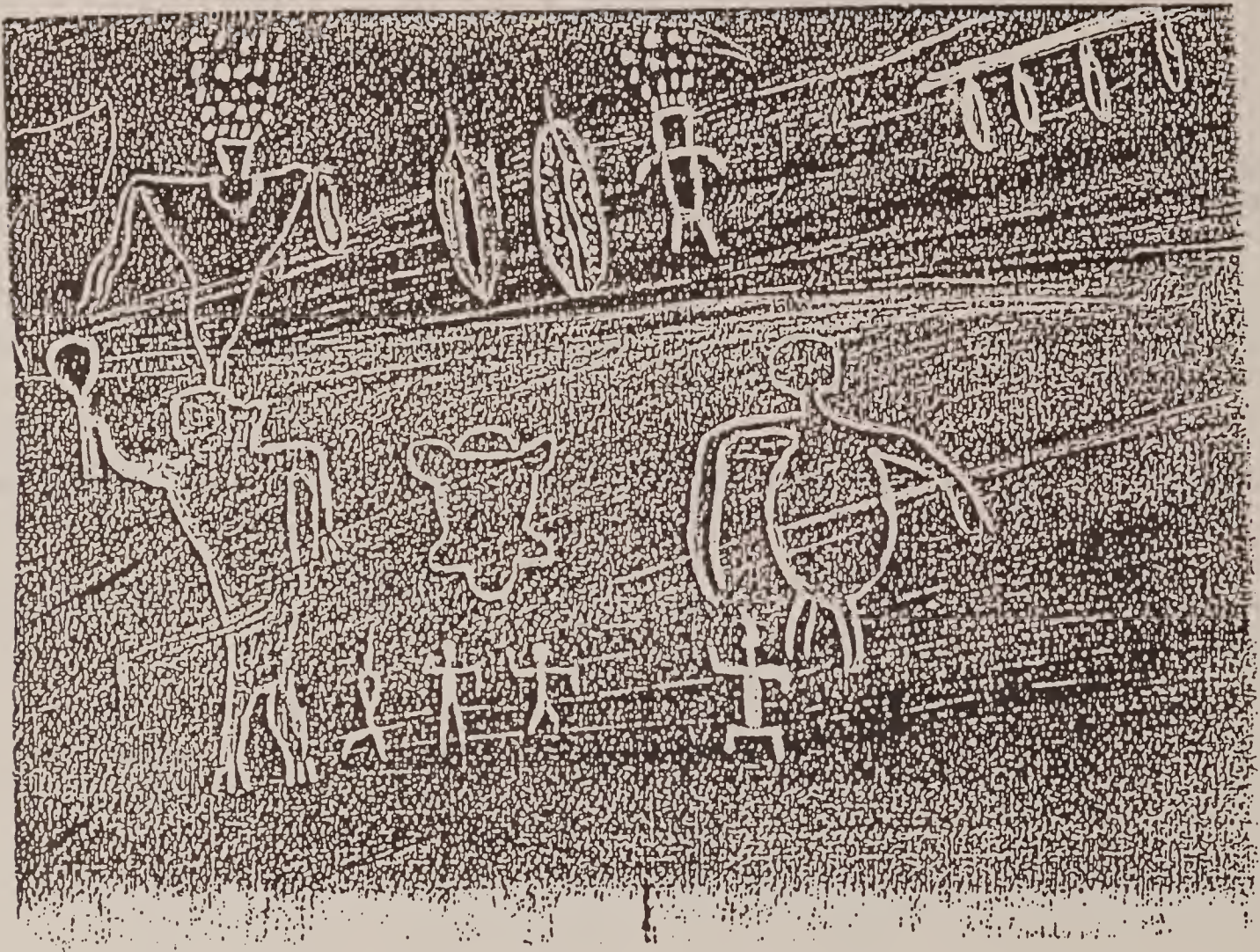
C Rate each solution according to each criterion on a scale of 1-5 (5 is highest, 1 is lowest). Use every number 1-5. Do not use a number twice in a column. Dotted numbers are for explanation only.

D Add the numbers across each solution line. Your highest number is your best solution. In the case of a tie, combine the 2 ideas into a super solution.

Decision Making



Solutions	Criteria					Total
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						





APPENDIX ONE

UTAH STATE BOARD OF EDUCATION CORE CURRICULUM CORRELATION

Intrigue of the Past: Investigating Archaeology supports the Utah State Board of Education Core Curriculum. This appendix is a summary of the standards and skills reinforced throughout the guide.

Science

Reinforced core curriculum skills: **classification; scientific inquiry (observation, inference, hypothesis); comparison; prediction; formulation of conclusions; investigation of careers.**

Social Studies

These standards are reinforced:

- 6040-01 The students will utilize a variety
- 6050-01 of speaking, listening, writing,
- 6060-01 reading, and citizenship/ character
- skills in completing social studies
- activities.

- 6060-03 The students will explain that every
- society has roles, norms, values, and
- sanctions to guide the behavior of
- individuals and groups within society.

- 6120-01 The students will demonstrate the
- ability to utilize critical thinking and
- decision-making skills in completing
- social studies activities.

Reinforced core curriculum skills: **explain the cultural contributions of Utah's Native American Indian; apply the concept of cultural diversity; use mapping skills.**

Language Arts

These standards are reinforced:

- 4040-01 The students will listen at different
- levels of understanding and respond
- with appropriate words or actions.

- 4040-02 The students will verbally communi-
- cate ideas, information, opinions,
- descriptions, and feelings as they
- participate in conversations and
- discussions.

- 4050-01 The students will develop critical
- 4060-01 listening skills for understanding
- verbal messages.

- 4050-02 The students will expand vocabulary
- and oral language skills as they
- participate in discussions and make
- verbal messages.

- 4060-02 The students will develop effective
- oral communication strategies for
- formal and informal situations.

Reinforced core curriculum skills: **interpret charts, graphs, and maps; analyze cause and effect; expand vocabulary; read for content; use critical reading skills; use writing skills.**

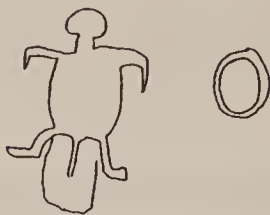
Math

Reinforced core curriculum skills: **plot and locate coordinates; use and create scale drawings; read and create graphs; use metric measurement; make appropriate computation; use ratios; compute circumference.**

Art

Reinforced core curriculum skills: **draw; develop observation skills; tell how artists get ideas; tell how artists use symbols; create a sculpture.**





APPENDIX TWO

CROSS REFERENCE BY SKILLS AND STRATEGIES

SKILLS

Analogy

Chronology: The Time of My Life
Measuring Pots
Archaeology and Ethnographic Analogy:
 The Anasazi and the Hopi
Grave Robbers
Archaeology—A Conservation Issue

Brainstorming

Why Is the Past Important?
Culture Everywhere
Section Two activities
Gridding A Site
Pollen Analysis
Measuring Pots
Experimental Archaeology: Making Cordage
Archaeology As A Career
Rock Art One: An Introduction
Rock Art Three: Protecting Our Past
Take Action—Save the Past

Categorize

Culture Everywhere
Section Two activities

Classification

Classification and Attributes
Scientific Inquiry
It's in the Garbage
Section Two activities
Artifact Classification

Communication

Section Two activities
Rock Art Three: Protecting Our Past
Artifact Ethics
The Road Showdown
Archaeology—A Conservation Issue
Take Action—Save The Past
Grave Robbers

Compare and Contrast

Culture Everywhere

Classification and Attributes

Section Two activities

Utah Place Names

Composing

Section Two activities
Artifact Ethics
A Journey Back In Time: A Guided Imagery

Computation

Section Two activities
Archaeology and Tree-Ring Dating
Measuring Pots
Experimental Archaeology: Making Cordage

Debate

Section Two Activities
Artifact Ethics
The Road Showdown
Archaeology—A Conservation Issue

Decision Making

Observation and Inference
Classification and Attributes
Section Two activities
Rock Art Three: Protecting Our Past
Rock Art Four: Creative Expression
Artifact Ethics
The Road Showdown
Archaeology—A Conservation Issue
Take Action—Save The Past

Discussion

Why Is the Past Important?
Culture Everywhere
Context
Chronology: The Time of My Life
It's in the Garbage
Section Two activities
Stratigraphy and Cross-Dating
Archaeology and Tree-Ring Dating
Pollen Analysis
Measuring Pots
Experimental Archaeology: Making Cordage
Rock Art One: An Introduction

Rock Art Three: Protecting Our Past
Artifact Ethics
Grave Robbers
A Journey Back in Time: A Guided Imagery
Archaeology—A Conservation Issue
Utah Place Names
Take Action—Save the Past

Drawing

Section Two activities
Rock Art One: An Introduction
Rock Art Two: Creating Your Own
Rock Art Three: Protecting Our Past
Artifact Ethics
A Journey Back In Time: A Guided Imagery

Experiment

Experimental Archaeology: Making Cordage

Forecasting

Chronology: The Time of My Life
It's in the Garbage
Section Two activities
Archaeology and Tree-Ring Dating
Pollen Analysis

Game

Context
Section Two activities

Graphing

Section Two activities
Pollen Analysis

Guided Imagery

A Journey Back In Time: A Guided Imagery

Interviewing

Archaeology As A Career
Grave Robbers

Invention

Section Two activities
Experimental Archaeology: Making Cordage
Rock Art Three: Protecting Our Past

Mapping

Section Two activities
Gridding A Site
Archaeology and Ethnographic Analogy: The
Anasazi and the Hopi
Utah Place Names

Observation

Classification and Attributes
Stratigraphy and Cross-Dating

Archaeology and Tree-Ring Dating
Rock Art One: An Introduction
Rock Art Three: Protecting Our Past

Planning

Section Two activities
Take Action—Save The Past

Problem Solving

Observation and Inference
Context
Chronology: The Time of My Life
It's in the Garbage
Section Two activities
Pollen Analysis
Rock Art Three: Protecting Our Past
Artifact Ethics
The Road Showdown
Archaeology—A Conservation Issue
Take Action—Save The Past

Reading

Section Two activities
Archaeology and Ethnographic Analogy:
The Anasazi and the Hopi
Experimental Archaeology: Making Cordage
Archaeology As A Career
Grave Robbers

Research Skills

Scientific Inquiry
It's in the Garbage
Section Two activities
Artifact Classification
Archaeology As A Career
Take Action—Save the Past

Role Play

Section Two activities
Artifact Classification
Archaeology and Ethnographic Analogy:
the Anasazi and the Hopi
The Road Showdown
Archaeology—A Conservation Issue

Scientific Inquiry

Observation and Inference
Classification and Attributes
Scientific Inquiry
Its in the Garbage
Gridding A Site
Artifact Classification
Experimental Archaeology: Making Cordage

Sculpting

Rock Art Four: Creative Expression

Sequence

Chronology: The Time of My Life
It's in the Garbage
Section Two activities

Using Scale

Gridding A Site

Values Clarification

Section Two activities
Rock Art Three: Protecting Our Past
Artifact Ethics
The Road Showdown
Grave Robbers
Archaeology—A Conservation Issue
Take Action—Save the Past

Visualization

Section Two activities
Rock Art One: An Introduction
Rock Art Two: Creating Your Own
The Road Showdown

Writing

Observation and Inference
Context
Classification and Attributes
Scientific Inquiry
It's in the Garbage
Section Two activities
Pollen Analysis
Experimental Archaeology: Making Cordage
Archaeology As A Career
Rock Art One: An Introduction
Rock Art Three: Protecting Our Past
Artifact Ethics
The Road Showdown
Grave Robbers
A Journey Back In Time: A Guided Imagery

STRATEGIES

Knowledge

Why Is the Past Important?
Culture Everywhere
Observation and Inference
Context
Chronology: The Time of My Life
Classification and Attributes
Section Two activities
Gridding A Site
Stratigraphy and Cross-Dating
Archaeology and Tree-Ring Dating
Pollen Analysis
Measuring Pots

Experimental Archaeology: Making Cordage
Archaeology As A Career
Rock Art One: An Introduction
Utah Place Names

Comprehension

Culture Everywhere
Observation and Inference
Context
Chronology: The Time of My Life
Classification and Attributes
Section Two activities
Gridding A Site
Stratigraphy and Cross-Dating
Archaeology and Tree-Ring Dating
Pollen Analysis
Measuring Pots
Experimental Archaeology: Making Cordage
Archaeology As A Career
Rock Art One: An Introduction

Application

Why Is the Past Important?
Observation and Inference
Context
Scientific Inquiry
Chronology: The Time of My Life
It's in the Garbage
Section Two activities
Gridding A Site
Stratigraphy and Cross-Dating
Artifact Classification
Archaeology and Tree-Ring Dating
Pollen Analysis
Measuring Pots
Experimental Archaeology: Making Cordage
Archaeology As A Career
Rock Art One: An Introduction
Artifact Ethics
Utah Place Names
Take Action—Save the Past

Analysis

Culture Everywhere
Observation and Inference
Context
Scientific Inquiry
Chronology: The Time of My Life
Classification and Attributes
It's in the Garbage
Section Two activities
Gridding A Site
Stratigraphy and Cross-Dating
Artifact Classification
Archaeology and Tree-Ring Dating
Pollen Analysis

Measuring Pots**Archaeology and Ethnographic Analogy:**

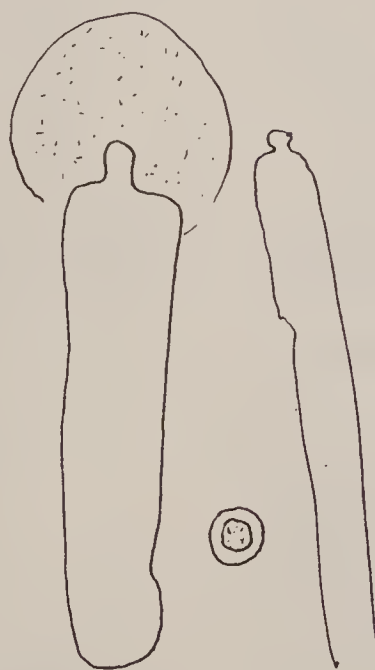
The Anasazi and the Hopi

Experimental Archaeology: Making Cordage**Rock Art One: An Introduction****Rock Art Three: Protecting Our Past****Artifact Ethics****The Road Showdown****Grave Robbers****Archaeology—A Conservation Issue****Utah Place Names****Take Action—Save the Past****Synthesis****Context****Scientific Inquiry****It's in the Garbage****Section Two activities****Pollen Analysis****Archaeology and Ethnographic Analogy:**

The Anasazi and the Hopi

Experimental Archaeology: Making Cordage**Rock Art Two: Creating Your Own****Rock Art Three: Protecting Our Past****Rock Art Four: Creative Expression****Artifact Ethics****The Road Showdown****Grave Robbers****A Journey Back In Time: A Guided Imagery****Archaeology—A Conservation Issue****Take Action—Save the Past****Evaluation****Why is the Past Important?****Culture Everywhere****Observation and Inference****Context****Scientific Inquiry****Chronology: The Time of My Life****Classification and Attributes****It's in the Garbage****Section Two activities****Gridding A Site****Stratigraphy and Cross-Dating****Artifact Classification****Archaeology and Tree-Ring Dating****Pollen Analysis****Measuring Pots****Archaeology and Ethnographic Analogy:**

The Anasazi and the Hopi

Experimental Archaeology: Making Cordage**Archaeology As A Career****Rock Art Three: Protecting Our Past****Rock Art Four: Creative Expression****Artifact Ethics****The Road Showdown****Grave Robbers****A Journey Back In Time: A Guided Imagery****Archaeology—A Conservation Issue****Utah Place Names****Take Action—Save the Past**



APPENDIX THREE

RESOURCE DIRECTORY FOR TEACHING ARCHAEOLOGY

This directory is a compilation of resources in archaeology which are readily available to Utah teachers. Many other resources of a more general or national scope exist, although they may be more difficult to obtain than those listed here.

For a complete and current list of nationwide resources for archaeological education, consult **Pathways to the Past: An Educator's Guide to Resources in Archaeology**, compiled and edited by K.C. Smith, January, 1990. It is available from the Museum of Florida History, Department of State, R.A. Gray Building, Tallahassee, FL 32399-0250, phone (904) 488-1484.

RESOURCES FOR TEACHERS

Caduto, Michael J. and Joseph Bruhae, 1989, *Keepers of the Earth: Native American Stories and Environmental Activities for Children*. Fulcrum, Inc., Golden, Colorado.

Interdisciplinary approach to teaching about the earth and Native American cultures for ages 5-12. Available at book stores for \$19.95.

Indian Education Advisory Committee, editors, n.d., *A Guide for Teachers: American Indians of Utah*. Utah State Board of Education, Salt Lake City, UT.
Resource guide for Utah Indian education.

McNutt, Nan, 1988, *Project Archaeology: Saving Traditions*. Sopris West, Longmont, CO.
P.A.S.T. is a middle school curriculum (grades 6 to 8) consisting of three units: The Artifact, The Site, The Culture. It includes a teacher's guide, three student field notebooks, a game, and filmstrip. Related artifact kits can be ordered. For information contact:

Sopris West
1140 Boston Avenue
Longmont, CO 80501
(303) 651-2829

Riley, Doloris and Wil Numkena, 1988, *A Teacher's Guide for the Maps and Charts Series:*

Conquest of Indian America. Utah State Office of Education, Salt Lake City, UT.

Learning objectives based on the maps and charts series. Includes activities, additional resources, and evaluation of student learning.

Utah State Office of Education, n.d., *Ethnic Folk Artists and Presenters for Multicultural Infusion of the Core Curriculum*. Utah State Board of Education, Salt Lake City, UT.

A guide to requesting and using multicultural activities in the classroom. Resources include Native American artists and presenters, lesson plans, and cultural packets. Available from:

Utah State Office of Education
500 South 250 East
Salt Lake City, UT 84111
(801) 538-7695

Zimmerman, Mary Ann, 1987, *Utah Prehistory: Social Studies and Talent Training*, Fourth Grade. Jordan School District, Sandy, UT.

Illustrated book about Utah's prehistory, a textbook written by a teacher. Includes activities for an independent study unit. Available by mailing \$7.50 plus 5 percent for postage and handling to:

JoAnn Seghini
Director of Curriculum
Jordan School District
9361 South 300 East
Sandy, UT 84070-2998
(801) 565-7100 ext. 161
(Curriculum Department)

Zimmerman, Mary Ann, 1987, *Utah Prehistory: Social Studies and Talent Training*, Seventh Grade. Jordan School District, Sandy, UT.

Illustrated book about Utah's prehistory, a textbook written by a teacher. Includes activities for an independent study unit. Available by mailing \$10.00 plus 5 percent for postage and handling to:

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Sandy, UT 84070-2998
(801) 565-7100 ext. 161
(Curriculum Department)



ARCHAEOLOGY TEACHING KITS

1. The Utah Statewide Archaeological Society has developed a teaching kit containing slides, representative artifacts from Utah's prehistoric periods, background materials, and a guide. The following organizations have teaching kits, and some are available for loan.

Utah Division of State History
Kevin Jones
300 Rio Grande
Salt Lake City, UT 84101
(801) 533-4563

Kits checked out to schools and other groups by reservation. Refundable deposit of \$25.00 required.

Bureau of Land Management
Richfield District
Craig Harmon
900 North 150 East
Richfield, UT 84701
(801) 896-8221
Contact BLM office for information.

Bureau of Land Management
San Rafael Resource Area
Blaine Miller
900 North 700 East
P.O. Drawer AB
Price, UT 84501
(801) 637-4584
Contact BLM office for information.

Bureau of Land Management
Arizona Strip Office
Rick Malcomson
225 Bluff Street
St. George, UT 84770
(801) 628-4491
Presentations offered using kit as teaching aid.

Edge of the Cedars State Park
Marshall Owens
P.O. Box 788
Blanding, UT 84511
(801) 678-2238
Contact Edge of the Cedars State Park for information.

Bureau of Land Management
Moab District
Bruce Louthan
P.O. Box 970
Moab, UT 84532
(801) 259-6111
Contact BLM office for information.

Utah Statewide Archaeological Society
c/o Keith Greenhalgh
3750 North 695 West
Ogden, UT 84401
(801) 782-4075
Presentations offered using kit as teaching aid.

Bureau of Land Management
Salt Lake District
Signa Larralde
2370 South 2300 West
Salt Lake City, UT 84119
(801) 977-4300
Contact BLM office for information.

Bureau of Land Management
San Juan Resource Area
Dale Davidson
435 North Main
Monticello, UT 84535
(801) 587-2141
Contact BLM office for information.

Price School District
c/o Margene Hackney
435 Rose Avenue
Price, UT 84501
(801) 637-0482
Call for information.

Department of Sociology, Social Work, and Anthropology
Steve Simms
Utah State University
Logan, UT 84322-0730
(801) 750-1277
\$10.00 fee for 5 days use; proceeds deposited in anthropology scholarship fund.

Bureau of Land Management
Utah State Office
Jeanne Moe/ Shelley Smith
324 South State Street, Suite 301
P.O. Box 45155
Salt Lake City, UT 84145-0155
(801) 539-4060 or 539-4066

Presentations offered on prehistory and archaeological methods using the kit as a teaching aid.

2. The Utah Museum of Natural History kit contains representative artifacts from Utah's prehistoric periods, figures illustrating artifacts and archaeological techniques, and a teacher's guide including background materials and classroom activities. For more information about the kits contact:

Utah Museum of Natural History
Marlene Lambert
President's Circle
University of Utah
Salt Lake City, UT 84112
(801) 581-4887

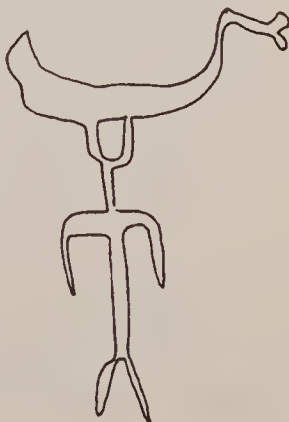
Kits are located at:

Northeastern Utah
Educational Service Center
Roger B. Brown
755 South Main
Heber City, UT 84032
(801) 654-1921

Southwest Educational
Development Center
Willard Bass
200 North 1552 West
Cedar City, UT 84720
(801) 586-2865

3. The Utah State Office of Education, Indian Education, has recent Indian artifacts for loan, including a miniature weaving frame, pottery, baskets, a cradle board, sand paintings, and more.

Utah State Office of Education
Educational Equity Section
500 South 250 East
Salt Lake City, UT 84111
(801) 538-7640



MEDIA RESOURCES

National Geographic: Educational Services Catalog

Catalog of learning kits, filmstrips, books, computer software, films, and videos available from the National Geographic Society. Free. Call 1-800-638-4077 or write:

National Geographic Society
P.O. Box 2895
Washington, D.C. 20077-9960.

VIDEO CASSETTES

Our Vanishing Heritage: Archaeological Vandalism in Utah.

(Intermediate/Secondary), 12 minutes. Explains the basis for the value of archaeological resources and the justification for their management and protection. Available for \$20.00 from:

2050 Media
300 South 400 East
Logan, UT 84321

What Price the Past?

(Intermediate/Secondary), 50 minutes. Reviews Utah's archaeological vandalism problem from several points of view: the archaeologist, the law enforcement ranger, the digger, the businessman, and the Native American. Available for \$25.00 from:

KSL-TV
55 North 300 West
Salt Lake City, UT 84103
(801) 575-5555

Or available on loan from:

Utah Museum of Natural History
President's Circle University of Utah
Salt Lake City, UT 84112
(801) 581-4887

Sun Dagger

(Intermediate/Secondary), 30 minutes. Discusses the Anasazi Sun Dagger, an astronomical observatory on Fajada Butte, New Mexico. Depicts the ingenuity and scientific sophistication of the Anasazi and archaeologists' attempts to interpret the structure. Available on loan from:

Utah Museum of Natural History
President's Circle
University of Utah
Salt Lake City, UT 84112
(801) 581-4887

Fremont Indian State Park

(Intermediate/Secondary), 31 minutes. Filmed during the excavation of sites in Clear Creek Canyon, this film shows excavation procedures and rock art and discusses prehistoric use of the local environment. Available for \$20.00 from:

Fremont Indian State Park
15500 Clear Creek Canyon Road
Sevier, UT 84766
(801) 527-4631

Gus Finds an Arrowhead

(Primary), 20 minutes. Gus, a comic character, digs up an arrowhead and is caught by a ranger. An archaeologist takes Gus on an archaeological tour to teach him the importance of cultural resource conservation. Available at District and Regional Media centers.

Winds of Change: A Matter of Promises

(Intermediate/Secondary), PBS home video, 60 minutes. Explores the plight of the Native American in today's society. Visits the Onondaga people of New York state, the Navajo Nation in Arizona, and the Lummi Nation in Washington state and witnesses the efforts of many proud, strong people as they struggle to preserve the traditions and heritage of cultures that are centuries old (\$19.95).

Instructional Media Company
1422 East Millbrook Way
P.O. Box 241
Bountiful, UT 84011
(801) 295-7670

Seasons of the Navajo

(Intermediate/Secondary), PBS home video, 60 minutes. A sensitive portrait of a traditional Navajo family living a life far removed from the 20th century (\$19.95).

Instructional Media Company
1422 East Millbrook Way
P.O. Box 241
Bountiful, UT 84011
(801) 295-7670

Instructional Media Company in Bountiful, Utah, carries several videos on archaeology and anthropology. Write or call the company for a catalog:
Instructional Media Company
1422 East Millbrook Way
P.O. Box 241
Bountiful, UT 84011
(801) 295-7670



UTAH STATE OFFICE OF EDUCATION MATERIALS:

Media materials on Indian studies are available from the Utah State Office of Education, Educational Equity Section. These materials can be used as supplemental resources in the study of American Indian history and culture.

Utah State Office of Education
Educational Equity Section
500 South 250 East
Salt Lake City, UT 84111
(801) 538-7640

List of media for loan:

16mm FILMS:

More Than Bows and Arrows

(Primary through secondary), 58 minutes. Focuses on contributions the American Indians have made toward the development of our nation. Areas of contributions covered are agriculture, medicine, government, architecture, art, and entertainment.

North American Indians Today

(Primary through secondary), 30 minutes. Focus is on Indians who live in an urban area and try to maintain their Indian cultural ties.



Video Cassettes (3/4" or 1/2")

Spirit Runner

(Primary through secondary), 15 minutes. Spotlights the Indian spirit in sports and athletics. Cameo appearance by U.S. Olympic Gold Medalist, Billy Mills.

Navajo

(Primary through secondary), 29 minutes. Focuses on Navajo tribal history, culture and traditions, plus the compromising of two cultures.

Mother Corn

(Primary through secondary), 28 minutes. Focuses on the spiritual significance and relationship of corn to the Pueblo Indian culture, traditions, and everyday life.

Contributions of American Indians

(Primary through secondary), 30 minutes. Focus is on how and what American Indians have contributed to the development of our nation.

Native American Series

a. "Heritage": A broad overview of early Native American Indian life through the use of songs, prayers, and legends.

b. "Voices": Dramatic interpretation of significant oratory from Indian leaders, both past and present.

c. "The Way": A discussion of philosophical and religious thoughts by Indian religious leaders.

d. "The Family": A dramatization of Iroquois family life, both past and present.

e. "Treaties": An examination of the significance of Indian treaties, both past and present.

f. "Survival": An interview with Northwest Coast activists Hank Adams and Marlon Brando, focusing on the fishing rights controversy in Washington State.

g. "Expressions in Art": An overview of Indian art, focusing on famous Acoma potter Lucy Lewis and the Santa Fe Institute of American Indian Art.

h. "Two Worlds": Examines Indian survival in the cities, focusing on an Indian family in Los Angeles.

i. "Powerless Politics": Examines the legislative and political aspects of Indian life, both past and present.

j. "Stereotypes": Examines Indian stereotypes in music, film and literature. Guests are Buffy Sainte-Marie and Floyd Westerman.

Hopi: Songs of the Fourth World

(Intermediate/Secondary), 58 minutes. Provides insight into the Hopi Indian culture from the insider's perspective. The philosophies and concepts shared in the film establish why the Hopi culture is still intact and has such a strong influence on the Hopi way of life. It captures images of Hopiland, a farmer, grandmother, family, potter, weaver, and artist.

Walking with Grandfather/Great Wolf and Little Mouse Sister (25 minutes)

a. *Walking with Grandfather* (Primary/Intermediate), 10 minutes. A presentation on the ecological concept of interdependence, that Mother Earth and the plants, animals, and humans are dependent on each other in maintaining an ecological balance.

b. *Great Wolf and Little Sister Mouse* (Primary/Intermediate), 15 minutes. Focuses on the values of sharing and helping. The main characters include a wolf and mouse who strengthen each other through sharing and helping.

Slide Presentations

Circles of Life

(Primary through Secondary). Focus is on traditional art and life of the Plains Indians. Includes a cross-section of art objects made by the Native American inhabitants of the Great Plains regions. Forty slides and cassette.

Film Strips

Utah's Native American Indians

(Intermediate/Secondary), 20 minutes. Focuses on the Indian tribes which are native to Utah, their reservation areas, historical briefs, current status and future. Purchase price: \$3.00. Comes with cassette.

Who Am I?

(Primary through Secondary), 15 minutes. A role model presentation focusing on prominent and successful Indians in various occupations. Comes with cassette.



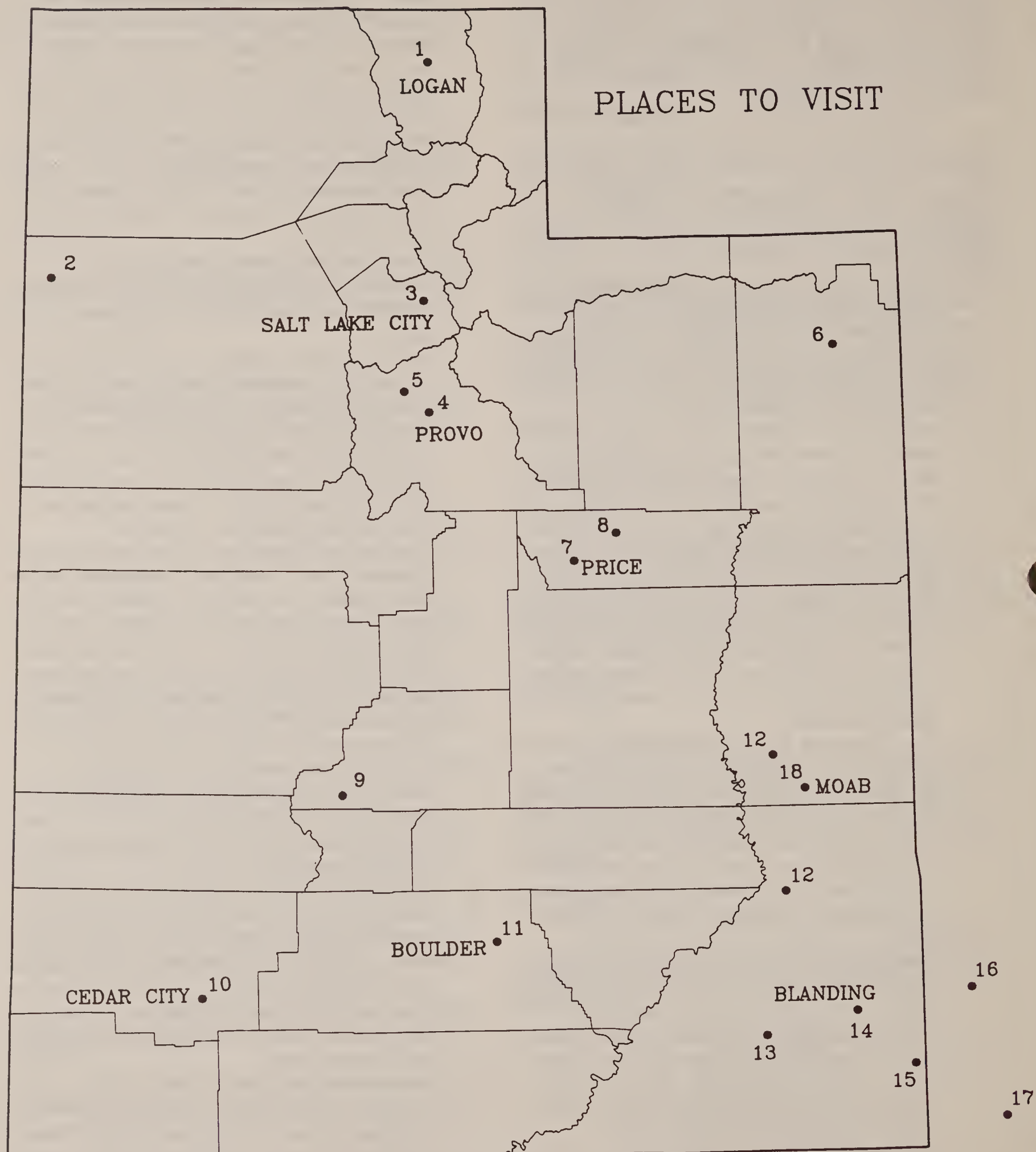
PLACES TO VISIT

Listed below are places of archaeological interest which are easily accessible by vehicle (numbers correspond to "Places to Visit" map). The list includes archaeological sites, parks, and museums in Utah and Southwestern Colorado. Many of these places provide special programs or materials for school groups.

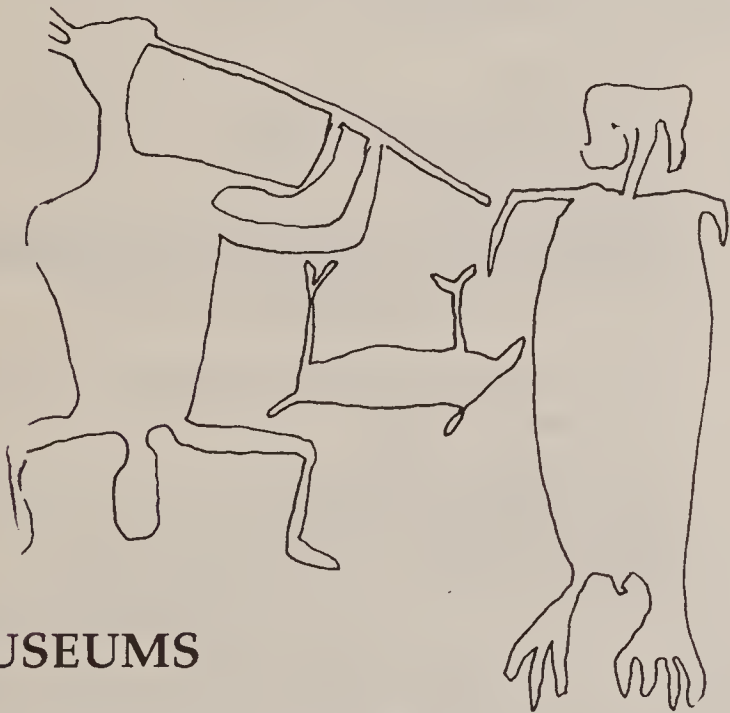
Call ahead and schedule your class field trip with site and museum managers. There are many other sites that may be educational for your school group to visit; however, most will require extra logistical preparations. Contact land managing agencies for suggestions on other places to visit in your area.

1. **Utah State University Anthropology Museum:** Located in Old Main on the Utah State University campus in Logan, Utah. Includes displays on general anthropology, Great Basin ethnography and archaeology, and historic railroads in Northern Utah.
2. **Danger Cave State Park:** Located immediately north of Interstate 80 in the Silver Island Mountain Range east of Wendover, Utah. An Archaic campsite and dwelling in a cave inhabited 11,500 years ago. Visitors are asked not to enter the cave due to ceiling spall. No on-site facilities or interpretation.
3. **Utah Museum of Natural History:** President's Circle at the University of Utah campus in Salt Lake City. Displays, dioramas, and artifacts exhibiting Paleo-Indian, Archaic, Fremont, Anasazi, Shoshonean and Navajo cultures.
4. **The Museum of Peoples and Cultures:** Located on the Brigham Young University campus in Provo, Utah. The Museum includes both long- and short-term exhibits, some of which are interactive. Collections emphasize six regions: Meso-America, the Southwest, the Great Basin, Polynesia, the Mediterranean-Near East, and Historical Western Archaeology.
5. **Hutchings Museum of Natural History:** Lehi, Utah. Utah County prehistoric artifact collection and historic gun collection.
6. **Utah Field House of Natural History State Park:** Vernal, Utah. Collections on display include prehistoric artifacts of Paleo-Indian, Archaic, and Fremont origin and protohistoric and historic artifacts of Ute origin.
7. **Prehistoric Museum of the College of Eastern Utah:** Price, Utah. Displays include a collection of Fremont artifacts and dioramas of prehistoric lifeways.
8. **Nine Mile Canyon:** Located east of Price, Utah. Numerous and well-preserved rock art panels, primarily of Ute and Fremont origin. Most of the canyon bottom land is privately owned. No on-site facilities or interpretation.
9. **Fremont Indian State Park:** Visitor Center and Museum located 13 miles south of Richfield, Utah, in Clear Creek Canyon near Interstate 70. The Park was established as a result of the excavation of Five Finger Ridge, the largest excavated Fremont site in Utah. The Park features rock art, nature trails, and a pithouse and the museum exhibits many Fremont artifacts.
10. **Southern Utah State College Museum:** Located on Southern Utah State College campus. Exhibits are mostly of Virgin Anasazi artifacts.
11. **Anasazi Indian Village State Park:** Visitor center and museum located in Boulder, Utah, on Utah Highway 12. Eleven pithouses and 67 surface rooms are partially excavated. The site exhibits one of the most northern occupations of the Anasazi into the Fremont cultural area. Museum includes a small collection of artifacts and dioramas.
12. **Canyonlands National Park and Arches National Park:** Both parks are located near Moab, Utah. Canyonlands Visitors' Center presents information on nature and archaeology. Roadside Ruin, an interpreted site, and the Cave Springs Cowboy Camp, an interpreted loop trail, are located in the Needles District. Arches Visitors' Center has interpretive displays.
13. **Natural Bridges National Monument:** Located approximately 30 miles west of Blanding, Utah. The archaeological sites on the Natural Bridges Loop Trail and the Horse Collar Ruin trail are interpreted.
14. **Edge of the Cedars State Park Museum and Pueblo:** Visitor Center and Museum, Blanding, Utah. A large Anasazi site with ten kivas and 75 surface rooms partially excavated. Some dwellings and kivas are partially restored. The Museum houses an impressive collection of Anasazi artifacts with displays and interpretation.
15. **Hovenweep National Monument:** Five groups of distinctive tower ruins located on McElmo Route, Colorado and Utah. Headquarters and ranger station with exhibits are located at Square Tower Ruin. Open 8-5 daily, year round. Nearby campground is \$3.00 per night. Maps are available at ranger station.

Map of Places to Visit



16. **Anasazi Heritage Center:** Located on Colorado Highway 184 near Dolores, Colorado. Visitor center, archaeological sites, and museum completed in 1988 as part of the Dolores Archaeological Project. Museum displays artifacts recovered from project excavations and interpretation of regional prehistory, archaeological methods, and analytical procedures. Partially excavated and restored Escalante Ruins located on the grounds. Interactive displays and school group programs available.
17. **Mesa Verde National Park:** Located on Colorado Highway 160 about ten miles east of Cortez, Colorado. Contains some of the most spectacular Pueblo II-III cliff dwellings in the Southwest. Some earlier pueblo ruins are found on the mesa tops. Museum and visitor center display Anasazi artifacts.
18. **Dan O'Laurie Museum:** Moab, Utah. Exhibits on prehistoric archaeology, especially the Anasazi, mining history, geology, and paleontology.



MUSEUMS

Anasazi Heritage Center
27501 Highway 184
Dolores, CO 81323
(303) 882-4811

Anasazi Indian Village State Park
P.O. Box 393
Boulder, UT 84716-0393
(801) 335-7308

College of Eastern Utah
Prehistoric Museum
400 North 451 East
College of Eastern Utah
Price, UT 84501
(801) 637-5060

Dan O'Laurie Museum
118 East Center Street
Moab, UT 84532
(801) 259-7985

Edge of the Cedars Museum
400 North 660 West
Blanding, UT 84511-0788
(801) 678-2238

Fremont Indian State Park
15500 Clear Creek Canyon Road
Sevier, UT 84766
(801) 527-4631

Hovenweep National Monument
c/o Mesa Verde National Park
Mesa Verde, CO 81330
(303) 529-4465

Hutchings Museum of Natural History
685 North Center Street
Lehi, Utah 84043
(801) 768-8710

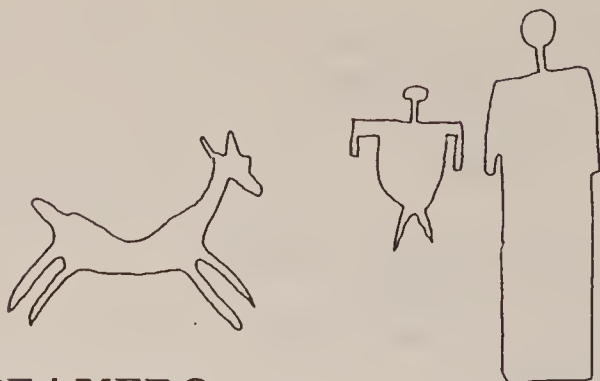
Mesa Verde National Park
Mesa Verde, CO 81330
(303) 529-4461

The Museum of Peoples and Cultures
105 Allen Hall
Brigham Young University
Provo, UT 84602
(801) 378-5435

Southern Utah State College Museum
351 West Center Street
Southern Utah State College
Cedar City, UT 84720
(801) 586-7870

Utah Museum of Natural History
President's Circle
University of Utah
Salt Lake City, UT 84112
(801) 581-4303

Utah State University
Anthropological Museum
Old Main
Utah State University
Logan, UT 84322-0730
(801) 750-1000



SPEAKERS

Archaeologists

Some archaeologists will visit your school and present a program about archaeology. Contact your local museum, college or university, or government agencies, such as the Bureau of Land Management, Forest Service, National Park Service, and the Division of State History.

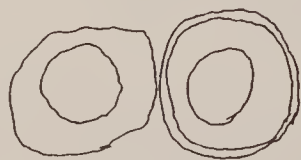
Members of the Utah Statewide Archaeological Society will also visit the classroom and give presentations about archaeology. Contact USAS at the Division of State History by calling (801) 533-4563, for the chapter nearest you.

American Indians

Contact tribal governments or museums near you to request Indian people to speak to your students. The Utah State Office of Education maintains a list of ethnic minority folk artists and presenters, accessed by calling (801) 538-7640. There is a \$25.00 charge for a speaker.

Utah Rock Art Research Association

Members of the Utah Rock Art Research Association will go to schools with prepared slide shows and presentations on rock art in Utah. Call Jesse Warner, (801) 596-3524, for further information.



EDUCATIONAL OPPORTUNITIES

Opportunities for "hands-on" archaeological experience and education are available for both teachers and students. Most of the organizations listed below charge for their services. Their inclusion on this list does not constitute an endorsement of their programs; rather, the list is provided strictly for your information.

Canyonlands Field Institute
P.O. Box 68
Moab, UT 84532
(801) 259-7750

Educational fieldtrips for adults and families. College credit available for some of the workshops and seminars.

Crow Canyon Archaeological Center
23390 County Road K
Cortez, CO 81321
1-800-422-8975

Offers a variety of fieldwork and laboratory research opportunities in archaeology and archaeobotany. For adults, teachers, families, and high school students.

Four Corners School
East Route
Monticello, UT 84535
(801) 587-2859/1-800-525-4456

Outdoor workshops and seminars in archaeology and anthropology.

Kelly Place
14663 County Road G
Cortez, CO 81321
(303) 565-3125

Instruction and experience in preservation and stabilization of on-site prehistoric ruins.

Utah Museum of Natural History
President's Circle
University of Utah
Salt Lake City, UT 84112
(801) 581-4887

Offers museum tours, docent training, teacher workshops, kits, outreach programs, seminars, speakers, and on-going classes for children and adults, some involving field trips. College credit and teacher recertification credit may be obtained for some classes.

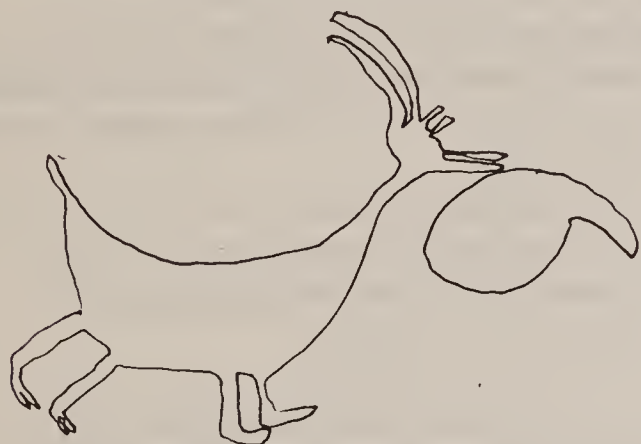
Utah Statewide Archaeological Society
Division of State History
300 Rio Grande
Salt Lake City, UT 84101
(801) 533-4563

A three-level archaeological certification course is offered through USAS and teacher recertification credit can be arranged. Upon completion of the course, USAS offers archaeological experience through participation in surveys and excavations conducted under the direction of professional archaeologists. Also opportunities for laboratory work and research.

White Mesa Institute
College of Eastern Utah
San Juan Campus
100 South 639 West (50-1)
Blanding, UT 84511
(801) 678-2201 or 451-2684

Outdoor educational opportunities with archaeological and anthropological experts. Some events are co-sponsored by other institutions.

In addition to the institutions listed, museums, state and federal agencies, and universities may accept volunteers to assist with field and laboratory projects. Universities and colleges throughout Utah offer courses in anthropology and archaeology including archaeological field schools.



RECOMMENDED READING— ADULT

BOOKS

Ambler, J. Richard, 1977, *The Anasazi*.
Museum of Northern Arizona, Flagstaff, AZ.
Well-illustrated introduction to Anasazi prehistory and culture.

Barnes, F. A., 1982, *Canyon Country*
Prehistoric Rock Art. Wasatch Publishers, Inc.,
Salt Lake City, UT.
Rock art of the Four Corners region.

Castleton, Kenneth D., M.D., 1984,
Petroglyphs and Pictographs of Utah, Volume
One: The East and Northeast. Utah Museum of
Natural History, Salt Lake City, UT.
Comprehensive overview of Utah rock art.

Castleton, Kenneth D., M.D., 1987,
Petroglyphs and Pictographs of Utah, Volume
Two: The South, Central, West, and Northwest.
Utah Museum of Natural History, Salt Lake
City, UT.
Comprehensive overview of Utah rock art.

Cordell, Linda S., 1984, *Prehistory of the*
Southwest. Academic Press, Inc., Harcourt
Brace Jovanovich, Publishers, New York, NY.
Scholarly overview of southwestern archae-
ology and prehistory from Paleo-Indian to
Protohistoric times.

Cordell, Linda S. and Dewitt Jones, 1985,
Anasazi World. Graphic Arts Center Publish-
ing Company, Portland, OR.

Reveals through color photographs and text
the most recent information on the Anasazi people
and why they abandoned the Four-Corners region.

Deetz, James, 1967, *Invitation to*
Archaeology. The Natural History Press, New
York, NY.

A basic guide to the science of archaeology;
easily readable.

Fagan, Brian M., 1981, *In the Beginning*.
Little, Brown and Company, New York, NY.
Comprehensive introduction to the discipline
of archaeology.

Fagan, Brian M., 1983, *Archaeology: A Brief*
Introduction. Little, Brown and Company,
New York, NY.
Good introductory text to the discipline of
archaeology.

Fagan, Brian M., 1990, *Ancient North*
Americans: The Archaeology of a Continent.
Thames & Hudson, New York, NY.
Excellent overview of North American pre-
history. Contains topical sections on how archae-
ologists do their work.

Jennings, Jesse D., 1978, *Prehistory of Utah*
and the Eastern Great Basin. University of Utah
Anthropological Papers, No. 98. Salt Lake
City, UT.
Overview of Utah and Great Basin prehis-
tory. Emphasis on Archaic Period and Fremont
developments.

Lister, Robert H. and Florence C. Lister, 1983,
*Those Who Came Before: Southwestern Archaeol-
ogy in the National Park System*. Southwest Parks
and Monuments Association, Tucson, AZ.
Prehistory of the Southwest. Gives viewpoints
of traditional cultural groups. Discusses the 28
National Parks and Monuments in the Southwest.

Madsen, David B., 1989, *Exploring the Fremont*. Utah Museum of Natural History, University of Utah, Salt Lake City, UT.

Recent and thorough overview of the Fremont. Informative and readable. Also recommended for secondary grades.

Petit, Jan, 1982, *Utes: The Mountain People*. Century One Press, Colorado Springs, CO. Describes the history and culture of the Utes.

Schaafsma, Polly, 1971, *The Rock Art of Utah*. Papers of the Peabody Museum of Archaeology and Ethnology, Volume 65. Harvard University, Cambridge, MA.

Regional guide to the prehistoric rock art of Utah. Numerous photographs and drawings.

Wheat, Margaret M., 1967, *Survival Arts of the Primitive Paiutes*. University of Nevada Press, Reno, NV.

Well-illustrated and fascinating book about techniques of manufacturing many types of tools and implements. Includes a discussion of Paiute culture. Adaptable for class projects.



JOURNALS AND MAGAZINES

American Antiquity. Professional technical journal of the Society for American Archaeology.

Society for American Archaeology
1703 New Hampshire Avenue, N.W.
Washington, D.C. 20009.

Anthro Notes. National Museum of Natural History Newsletter for Teachers. Free booklets on teaching anthropological topics, including archaeology. Published three times a year. To be added to the mailing list contact:

Ann Kaupp
Public Information Office
Department of Anthropology
Stop 112
Smithsonian Institution
Washington, D.C. 20560.

Archaeology. Popular publication of the Archaeological Institute of America. Each year the May/June issue features a travel guide of sites open to the public.

Archaeological Institute of America
15 Park Row, Suite 1732
New York, NY 10038

National Geographic. Popular publication of the National Geographic Society. Especially useful for teaching about other cultures. Often has articles on archaeological topics.

National Geographic Society
P.O. Box 2895
Washington, D.C. 20077-9966

Natural History. Popular publication of the American Museum of Natural History. Many issues have articles about anthropology and archaeology.

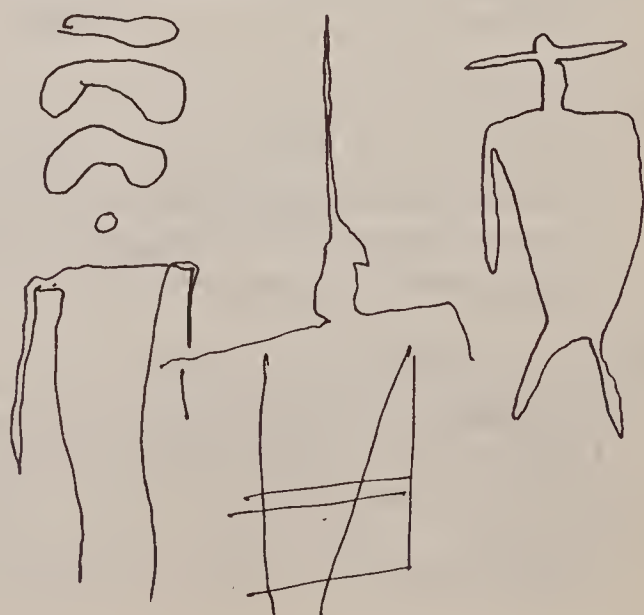
American Museum of
Natural History
Central Park West at 79th Street
New York, NY 10024

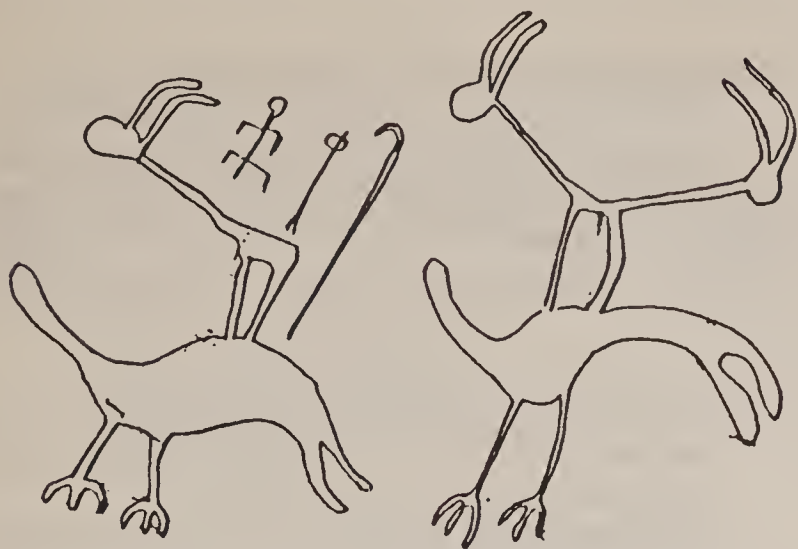
Smithsonian. Popular publication of Smithsonian Associates. Often includes articles about archaeology and anthropology.

Smithsonian Associates
900 Jefferson Drive
Washington, D.C. 20560

Utah Archaeology. Published annually by the Utah Statewide Archaeological Society and the Utah Professional Archaeological Council.

Utah Statewide Archaeological Society
c/o Division of State History
300 Rio Grande
Salt Lake City, UT 84102.





RECOMMENDED READING— CHILDREN

The following list is a small sample of publications in archaeology and anthropology for children. Many other books are available at libraries, book stores, and museum shops.

Aliki, 1976, *Corn Is Maize, the Gift of the Gods*. Thomas Crowell, New York., NY
(Primary) Science book on the history of corn.

Aliki, 1977, *Wild and Woolly Mammoths*.
Thomas Crowell, New York, NY.
(Primary) Science book about Ice Age mammoths.

Baylor, Byrd, 1976, *And It Is Still That Way: Legends Told by Arizona Indian Children*. Charles Scribner's Sons, New York, NY.
(Primary) A compilation of legends and stories as told by Hopi, Navajo, and other Arizona Indian children.

Baylor, Byrd, 1969, *Before You Came This Way*. Dutton Publishers, New York, NY.
(Primary) A story about prehistoric Indian petroglyphs.

Baylor, Byrd, 1972, *When Clay Sings*.
Charles Scribner's Sons, New York, NY.
(Primary) A Native American perspective on prehistoric pottery designs.

Baylor, Byrd, 1975, *The Desert Is Theirs*.
Charles Scribner's Sons, New York, NY.
(Primary) A story about Indian desert people and nature.

Baylor, Byrd, 1978, *The Way to Start a Day*.
Charles Scribner's Sons, New York, NY.
(Primary) Celebration of morning by many cultures.

Bleeker, Sonia, 1955, *The Pueblo Indians: Farmers of the Rio Grande*. William Morrow & Company, New York, NY.

(Primary/Intermediate) Good cultural study and history of the River Pueblos told through the point of view of a 12-year-old boy.

Brown, Dee, 1974, *Wounded Knee: An Indian History of the American West*. Holt, Rinehart and Winston, New York, NY.

(Intermediate) Adapted for young readers from *Bury My Heart at Wounded Knee*. Good historical accounts of Indian/white relations in the 19th century.

Cork, Barbara and Struan Reid, 1984, *The Young Scientist Book of Archaeology*. EDC Publishing, Tulsa, OK.

(Primary/ Intermediate) Good overview of archaeological methods, mostly about classical sites in Europe.

Fradin, Dennis B., 1983, *A New True Book: Archaeology*. Children's Press, Chicago, IL.

(Primary) A basic book about the methods and procedures used by archaeologists to study the past.

Freeman, Brian and Jody Freeman, 1986, *The Old Ones: A Children's Book about the Anasazi Indians*. The Think Shop, Inc. Albuquerque, NM.

(Primary) Informative. A good discussion of lifeways. Good illustrations and photographs.

Goble, Paul, 1989, *Beyond the Ridge*.
Bradbury Press, New York, NY.

(Primary/Intermediate) A sensitive portrayal of the life and death of a loved one in a Plains Indian society.

Hillerman, Tony, 1972, *The Boy Who Made Dragonfly*. University of New Mexico Press, Albuquerque, NM.

(Intermediate) The retelling of a traditional Zuni myth: a drought ruins the crops, and a little boy saves his village from disaster.

Hobbs, Ida May, 1987, *The Coming of Grey Owl*. Mesa Verde Museum Association, Mesa Verde National Park, CO.

(Intermediate) The story of a young Anasazi boy's life at Mesa Verde.

Macaulay, David, 1979, *Motel of the Mysteries*. Houghton Mifflin, Boston, MA.

(Intermediate/Secondary) A humorous story about future archaeologists trying to figure out who Americans were based on artifacts left over from a disaster that wiped out most of human civilization.

Morrison, Velma Ford, 1981, *Going on a Dig*. Dodd, Mead & Company, New York, NY.

(Intermediate) Excellent book about archaeological methods. Also includes information about students who participated in excavations at the Koster Site in Illinois.

O'Dell, Scott, 1970, *Sing Down the Moon*. Houghton Mifflin Company, Boston, MA.

(Intermediate) In 1864 Navajo life at Canyon de Chelly is changed forever as the Long Knives (white soldiers) burn the village and drive the Navajos on the Long March away from their homes.

Osinki, Alice, 1987, *A New True Book: The Navajo*. Children's Press, Chicago, IL.

(Primary) Contains some contradictory information on the origin of the Navajo, otherwise a good cultural study of the historic and modern Navajo.

Palmer, William R., 1978, *Why the North Star Stands Still and Other Indian Legends*. Zion Natural History Association, Springdale, UT.

(Intermediate) A collection of Paiute Indian stories and legends retold by a white man who was granted permission to tell them.

Pickering, Robert B., 1987, *I Can Be an Archaeologist*. Children's Press, Chicago, IL.

(Primary) A basic book about what archaeologists do.

Pitts, Paul, 1988, *Racing the Sun*. Avon Books, New York, NY.

(Intermediate) 12-year-old Brandon has been raised in the suburbs of Salt Lake City and knows little of his Indian heritage until Grandfather leaves the reservation, moves into Brandon's room, and teaches him Navajo traditions.

Red Hawk, Richard, 1988, *Grandfather's Story of Navajo Monsters*. Sierra Oaks Publishing Company, Sacramento, CA.

(Primary) A collection of traditional Navajo monster stories.

Skurzynski, Gloria, 1984, *Trapped in the Slickrock Canyon*. Lothrop, New York, NY.

(Intermediate) Gina and Justin barely tolerate each other until they discover armed vandals removing an Indian rock art panel from a canyon. Now they must rely on each other in the face of great peril.

Stuart, Gene S., 1979, *Secrets from the Past*.

Books for World Explorers, National Geographic Society, New York, NY.

(Intermediate) Good source of information for the student interested in archaeology. Workbook contains some good classroom activities.

Tomchek, Ann Heinrichs, 1987, *A New True Book: The Hopi*. Children's Press, Chicago, IL.

(Primary) A good cultural study of the historic and modern Hopi.

Trimble, Stephen, 1990, *The Village of Blue Stone*. Macmillan Publishing Company, New York, NY.

(Intermediate) Recreates one year in the life of an Anasazi community. Carefully researched, includes considerable information about culture and archaeology. Beautifully illustrated.

Utah-Ouray Ute Tribe, 1977, *The Way It Was Told*. University of Utah Printing Service, Salt Lake City, UT.

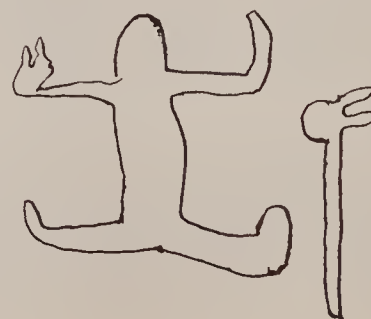
(Intermediate) Collection of Ute stories and mythology from various sources.

Utah-Ouray Ute Tribe, 1977, *The Ute People*. University of Utah Printing Service, Salt Lake City, UT.

(Intermediate) Cultural history of the Ute people.

Yue, David and Charlotte Yue, 1986, *The Pueblo*. Houghton Mifflin, Boston, MA.

(Primary/Intermediate) A summary of Anasazi and Pueblo lifeways including architectural development and cultural history.



AMERICAN INDIAN TRIBES

These listings are subject to change. For updated information about specific Tribal contacts call:

Division of Indian Affairs
Wil Numkena, Director
324 South State Street, Suite 103
Salt Lake City, UT 84111
(801) 583-8808

Goshute Indian Tribe (Confederate
Tribes of Goshute Reservations)
Harlan Pete, Chair
P.O. Box 6104
Ibapah, UT 84034
(801) 238-1138

Kanosh Band of Paiutes
McKay Pkyavit
P.O. Box 178
Kanosh, UT 84637
(801) 759-2660 or 586-1112

Koosharem Band of Paiutes
Vera Charles, Chair
P.O. Box 454
Richfield, UT 84701
(801) 896-9025

Northwestern Band of Shoshone
Leonard M. Alex, Chair
P.O. Box 850
Fort Hall, ID 83203
(208) 785-7302

Paiute Indian Tribe of Utah
Geneal Anderson, Chair
600 North 100 East
Cedar City, UT 84720
(801) 586-1112

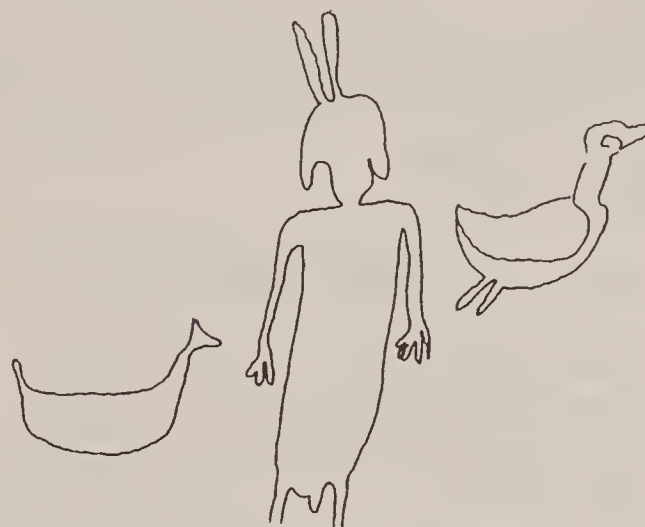
Shivwits Band of Paiutes
P.O. Box 391
Santa Clara, UT 84765
(801) 628-1468

Skull Valley Goshute Tribe
P.O. Box 485
Grantsville, UT 84029
(801) 250-5911, ext. 2020 or
c/o Danny Quintana, Attorney
395 South 600 East, Suite 200
Salt Lake City, UT 84102
(801) 363-7726

Ute Indian Tribe
Luke Duncan, Chair
P.O. Box 190
Fort Duchesne, UT 84026
(801) 722-5141

White Mesa Ute Council
Mary Jane Yazzie, Chair
P.O. Box 340
Blanding, UT 84511
(801) 678-3397

Navajo Nation
Peterson Zah, President
P.O. Box 308
Window Rock, AZ 86515
(602) 871-4941



AGENCIES

This section lists state and federal agency offices with archaeologists on staff.

STATE AGENCIES

Division of State History
300 Rio Grande
Salt Lake City, UT 84101-1182
(801) 533-5755

Anasazi Indian Village State Park
P.O. Box 393
Boulder, UT 84716-0393
(801) 335-7308

Edge of the Cedars Museum
400 North 660 West
Blanding, UT 84511-0788
(801) 678-2238

Fremont Indian State Park
15500 Clear Creek Canyon Road
Sevier, UT 84766
(801) 527-4631

FEDERAL AGENCIES**National Park Service**

Arches and Canyonlands
National Park
200 South 125 West
Moab, UT 84532
(801) 259 7164

Mesa Verde National Park
Mesa Verde, CO 81330
(303) 529-4461

Hovenweep National Monument
c/o Mesa Verde National Park
Mesa Verde, CO 81330
(303) 529-4465

Forest Service

Intermountain Regional Office
324 25th Street
Ogden, UT 84401
(801) 625-5172

Ashley and Wasatch-Cache
National Forests
125 South State Street
Federal Building, Room 8230
Salt Lake City, UT 84138
(801) 524-6333

Dixie National Forest
P.O. Box 580
Cedar City, UT 84720
(801) 865-3700

Uinta National Forest
88 West 100 North
Provo, UT 84603
(801) 377-5780

Manti-LaSal National Forest
Monticello District
P.O. Box 820
Monticello, UT 84353
(801) 587-2041

Fishlake National Forest
900 North 115 East
Richfield, UT 84701
(801) 896-4491

Manti-LaSal National Forest
599 West Price River Drive
Price, UT 84501
(801) 637-2817

Bureau of Land Management

Utah State Office
324 South State Street, Suite 301
Salt Lake City, UT 84111
(801) 539-4066

Salt Lake District
2370 South 2300 West
Salt Lake City, UT 84119
(801) 977-4300

Cedar City District
176 East D.L. Sargent Drive
Cedar City, UT 84720
(801) 586-2401

Kanab Resource Area
320 North 100 East
Kanab, UT 84714
(801) 644-2672

Richfield District
900 North 150 East
Richfield UT, 84701
(801) 896-8221

Warm Springs Resource Area
500 North 15 East
Fillmore, UT 84631
(801) 743-6811

Moab District
82 East Dogwood
Moab, UT 84532
(801) 259-6111

Grand Resource Area
Sand Flats Road
Moab, UT 84532
(801) 259-8193

San Rafael Resource Area
900 North 700 East
Price, UT 84501
(801) 637-4584

San Juan Resource Area
435 North Main
Monticello, UT 84535
(801) 587-2141

Vernal District
170 South 500 East
Vernal, UT 84078
(801) 789-1362

ORGANIZATIONS

The Archaeological Conservancy
415 Orchard Drive
Santa Fe, NM 87501-9990
(505) 982-3278

The Archaeological Conservancy buys threatened sites and protects them from development and damage.

Utah Statewide Archaeological Society
c/o Division of State History
300 Rio Grande
Salt Lake City, UT 84101
(801) 533-4563

USAS, an organization of avocational archaeologists, has several local chapters in the state. Chapters each have a professional archaeologist as advisor, and are actively involved in a variety of field, research, and education programs. A three-level certification course is offered through USAS chapters. Chapters publish periodic newsletters and the statewide organization co-publishes *Utah Archaeology* with the Utah Professional Archaeological Council. Contact the state office at the Utah Division of



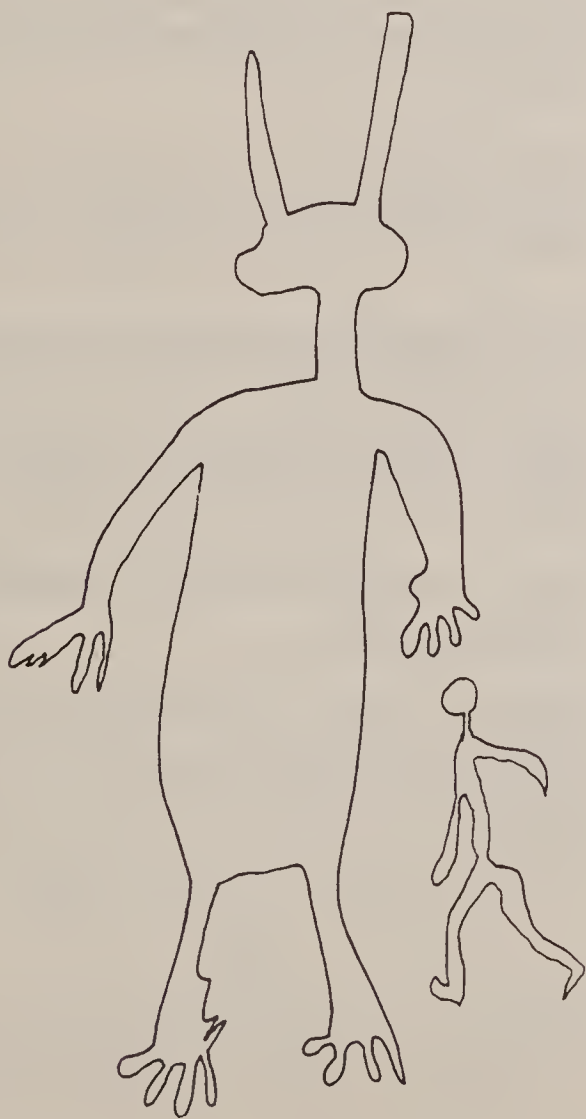
State History for the chapter nearest you.

Utah State Historical Society
Dr. Kent Powell
Division of State History
300 Rio Grande
Salt Lake City, UT 84101
(801) 533-5755

The USHS has several local chapters around the state. These chapters can provide assistance to teachers. Contact the Division of State History for the chapter nearest you.

Utah Rock Art Research Association
Jesse Warner, President
960 West 700 South
Salt Lake City, UT 84104
(801) 596-3524

The purpose of the Utah Rock Art Research Association is to preserve rock art in Utah and educate the public about its value. Publishes a newsletter called *Vestiges*, sponsors an annual convention and symposia, and conducts field trips. Members will come to schools with prepared slide shows and presentations.





APPENDIX FOUR

VOCABULARY

archaeology: a method for studying past human cultures and analyzing material evidence (artifacts and sites).

archaeological site: a place where human activity occurred and material remains were left.

artifact: any object made or used by humans.

atlatl (AT-lat-l): a throwing stick, used to launch stone-tipped darts.

attribute: characteristics or properties of an object such as size, color, or shape.

behavioral inference: conclusions about human behavior; archaeologists make inferences about the behavior of past people based on objects.

Cartesian coordinate system: two- or three-dimensional graph based on intersecting, incremented lines or planes.

ceramics: vessels made of fired clay.

chronology: an arrangement of events in the order in which they occurred.

classification: systematic arrangement in groups or categories according to established criteria.

Clovis point: a type of stone projectile point made by early Paleo-Indians for use as a spear tip, characterized by a short, shallow channel on one or both faces, and larger than a Folsom point.

context: the relationship artifacts have to each other and the situation in which they are found.

coprolites: fossilized human feces.

cordage: several strands of fiber twisted together; string or rope.

core: a prepared nodule of stone which a flintknapper strikes to remove thin flakes of stone; the remnant chunk of stone left after flintknapping.

cross-dating: the principle that a diagnostic artifact dated at one archaeological site will be of the same approximate age when found elsewhere.

cultigen: a plant which is dependent on humans to grow and reproduce.

culture: the set of learned beliefs, values and behaviors generally shared by members of a society. "The way the members of a group of people think and believe and live, the tools they make, and the way they do things" (Braidwood 1967:30).

cultural relativism: studying other cultures without judgments or categories from one's own culture.

data: information, especially information organized for analysis.

datum: something to use as a basis for measuring.

deface: spoiling or marring the surface or appearance of something.

dendrochronology: determining the age of a tree by counting its rings; the study of tree-ring dating.



diagnostic artifact: an item that is indicative of a particular time and/or cultural group; a computer would be a diagnostic artifact of the modern age.

dialect: a regional variety of a language.

ethnocentrism: the attitude that one's traditions, customs, language, and values are the only right and proper way and that other cultures are inadequate or wrong.

ethnographic analogy: inferring the use or meaning of an ancient site or artifact based on information from ethnographic sources.

ethnography: description of a culture based on observation of and interaction with living people.

evidence: data which are used to prove a point or which clearly indicate a situation.

experimental archaeology: scientific studies designed to discover processes that produced and/or modified artifacts and structures that are found in archaeological sites.



fiber: a slender threadlike strand or string. Bast fibers are the long fibers from a plant stock.

flake: a thin piece of stone removed from a nodule by striking it with a flaker made of bone, antler, or other stone. Flakes have sharp edges, and could be used as cutting implements. Flakes were also further shaped into tools or were left as waste by-products of flintknapping.

flintknapping: the technique of making stone tools from natural stone.

Folsom point: a type of stone projectile point made by later Paleo-Indians for use as a spear tip. Characterized by a long, shallow channel on one or both faces, and smaller than a Clovis point.

grid unit: a specific spatial area on the Cartesian coordinate system, designated by the co-ordinate in one corner (usually the southwest corner).

hogan: the type of home built by Navajo people, usually round and built of logs with mud mortar.

hypothesis: a proposed explanation accounting for a set of facts that can be tested by further investigation.

increment borer: an instrument used to remove a core sample from a tree.

inference: a conclusion derived from observations.

kiva: usually an underground structure, for ceremonial use. First built by the Anasazi people; Hopi and Rio Grande Pueblo people continue to build and use kivas today.

mammoth: an Ice Age animal related to the African elephant.

mano: the shaped, hand-held stone used to grind grains, nuts, seeds, and mineral pigments by moving it back and forth on a metate.

megafauna: literally, large animals; applied to the now extinct animals of the Ice Age, including mammoths, giant ground sloths, and short-faced bears.

metate: a shaped stone slab used as a base upon which grains, nuts, seeds, and mineral pigments were ground with a mano.

midden: an area used for trash disposal.

myth: usually a traditional story of presumably historical events that serves to unfold part of a world view of a people or explain a practice, belief, or natural phenomenon.

Numic: The term applied to Indian people who historically spoke a derivative of the Numic language. Modern-day Northern Paiute, Southern Paiute, Goshute, Ute, and Shoshone people are descendants of Numic speakers.

observation: recognizing or noting a fact or occurrence.



Paiute: an Indian tribe whose traditional territory included the Great Basin of California, Nevada, Oregon, Utah and Idaho. Their descendants in Utah are the Southern Paiute Indian people.

Paleo-Indian: the name given to the oldest known cultural group in Utah.

palynology: the study of pollen grains.

perspective: point of view.

petroglyph: a design chiseled or chipped out of a rock surface.

pithouse: a type of structure built partly underground so that the earth forms all or part of the side walls.

pictograph: a design painted on a rock surface.

Pleistocene: the Ice Age; the epoch of geologic time from 1.6 million years ago to 10,000 years ago, characterized in North America by periods of glacial advance and retreat.

pollen: a powdery substance produced by flowering plants. Pollen is the male genetic material, which pollinates (fertilizes) the female part of the flower to produce fertile seeds.

pot sherd: a piece of broken pottery

projectile point: the stone point attached to the end of darts, spears, and arrows. Often erroneously termed "arrowheads." In historic times, some people made metal projectile points.

pueblo: Spanish for "town;" applied to a type of Anasazi structure with joined rooms, built above ground, and sometimes more than one story high.

replication: the act or process of reproducing artifacts, structures, and use patterns.

rock art: a general term for the pecking, incising, or painting of designs onto rock surfaces.

rock art panel: a group or collection of pictograph or petroglyph figures.

sherd: a piece of broken pottery.

sinew: animal tendon prepared to use as cord or thread.

site datum: an arbitrarily established point from which the entire site is measured and recorded.

spatial: concerned with space.

strata: many layers of earth.

stratigraphy: the layering of deposits in archaeological sites. Cultural remains and natural sediments become buried over time; the layer on the bottom is the oldest, the layer on the top is youngest.

stratum: one layer of earth.

symbol: a thing which represents something else.

technology: the technique or means for making or doing something, often associated with tool making.

temporal: concerned with time.

timeline: a visual representation of events in chronological order.

vandalism: willfully or maliciously defacing or destroying public or private property.

vessel: a hollow or concave utensil for holding something.

wickiup: a small temporary structure usually constructed of brush and poles, and usually conical in shape.





APPENDIX FIVE

RULES FOR BRAINSTORMING

1. **CRITICISM IS RULED OUT**

Judgement of positive and negative ideas must be withheld. No one should criticize anyone else's ideas.

2. **FREEWHEELING IS WELCOME—THE WILDER THE BETTER**

It is easier to tame down than to think up ideas. Don't be afraid to say anything that comes into your mind--the farther out the idea the better. This complete freedom stimulates more and better ideas.

3. **QUANTITY IS WANTED**

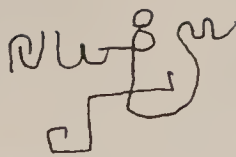
The greater the number of ideas, the more likelihood of winners. Come up with as many ideas as you can.

4. **TRY PIGGYBACKING IDEAS—COMBINATION AND IMPROVEMENT**

In addition to contributing ideas of your own, suggest how ideas of others can be turned into better ideas, or how two or more ideas can be joined into still a better one.

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